

NOVEMBER/DECEMBER 1996

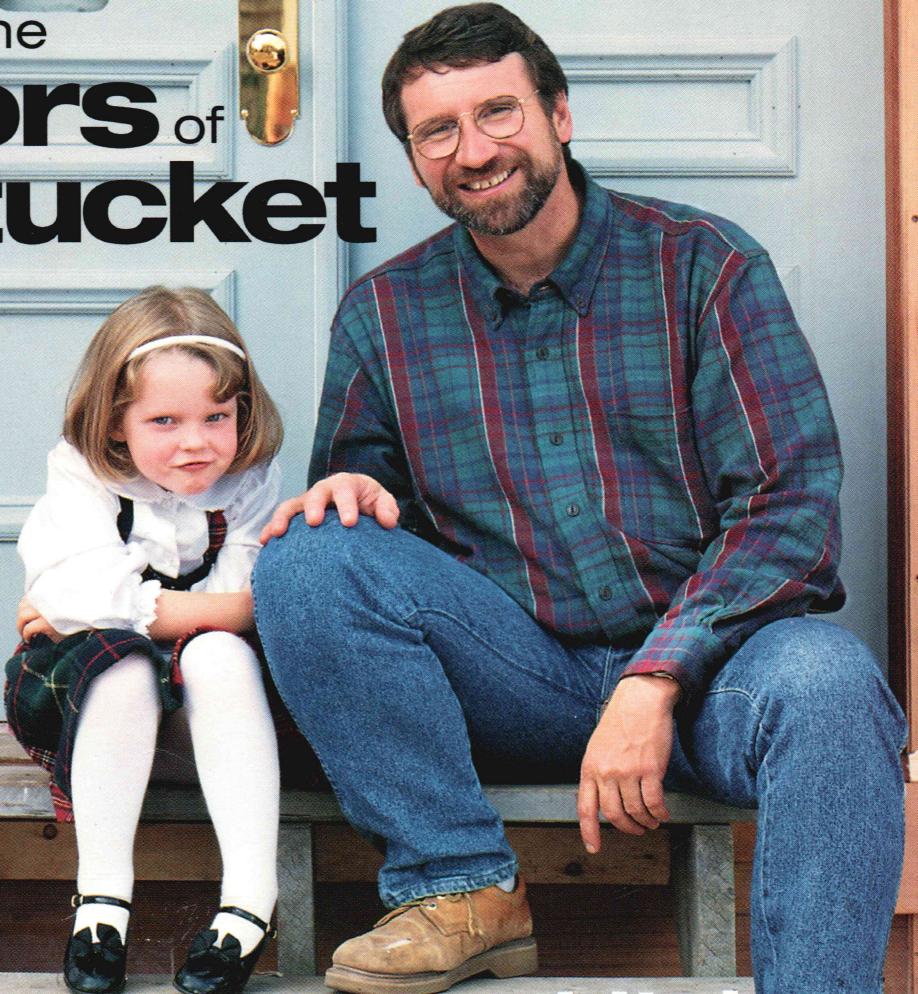
This Old

House

restoring the
doors of
Nantucket

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- hacksaws
- kids' tools



Norm Abram
and owners'
daughter
Morgan Bentley
at the fall TV
project house

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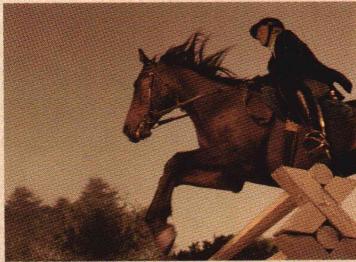
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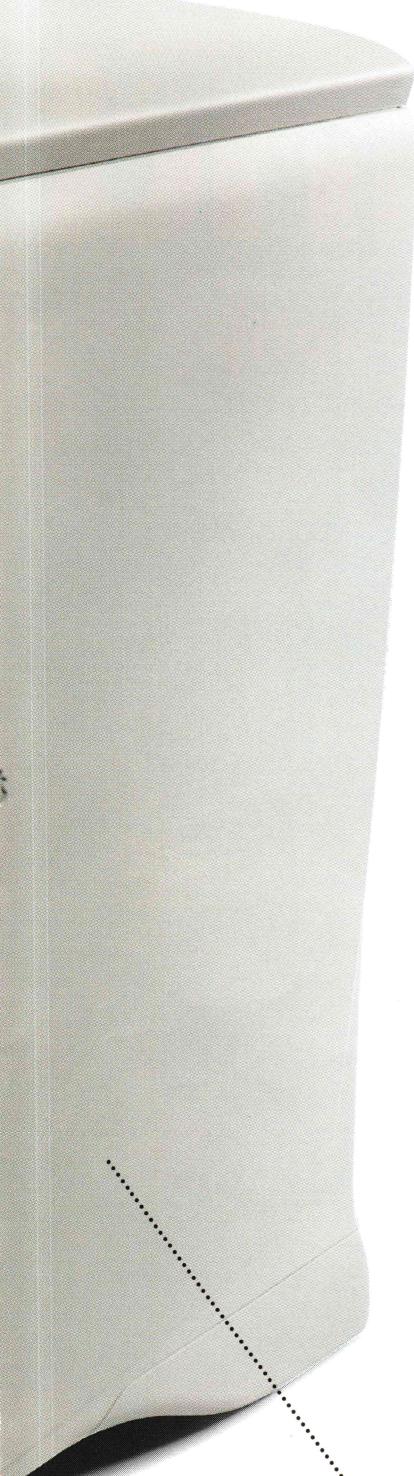
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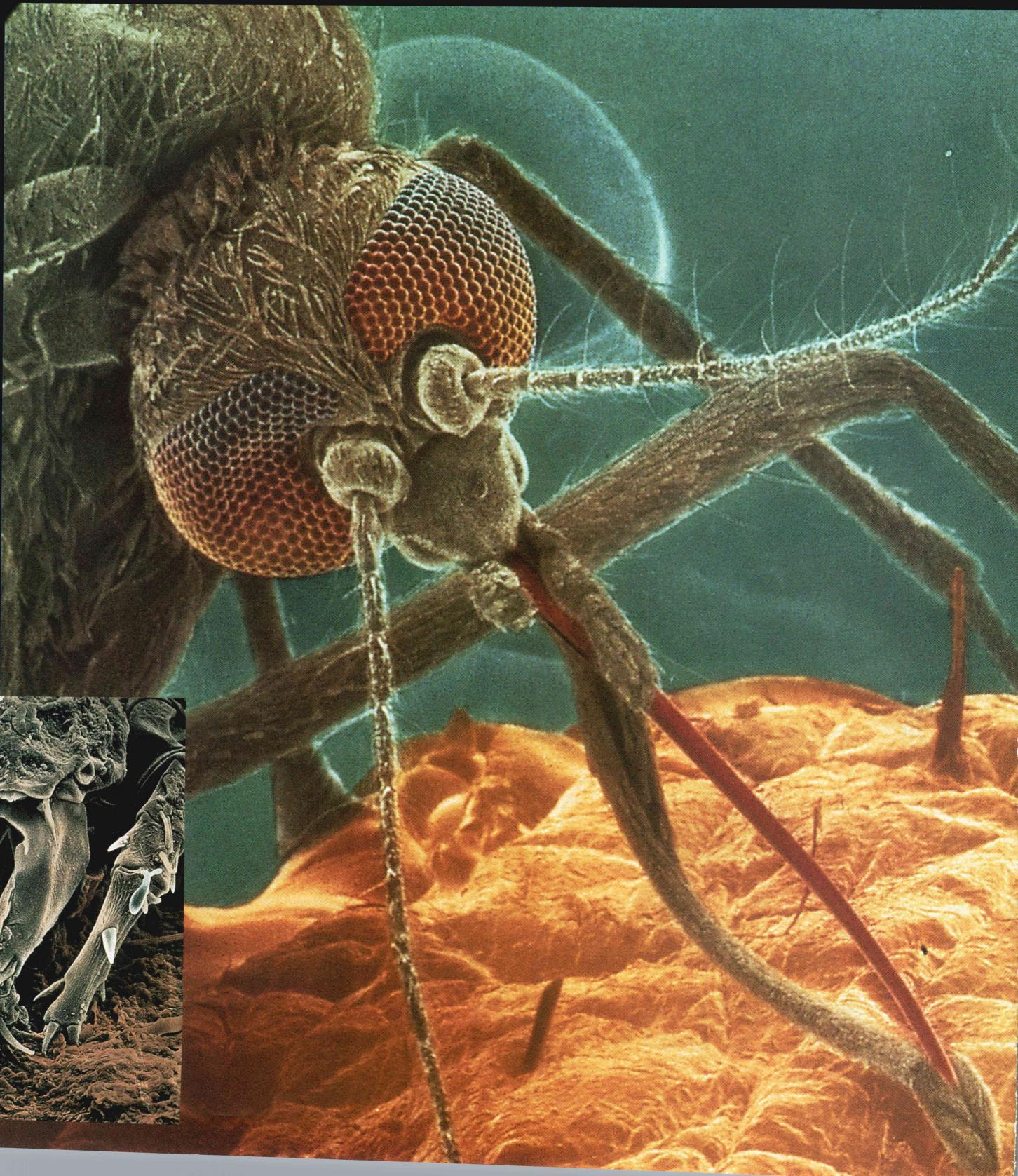


an a personal computer get?

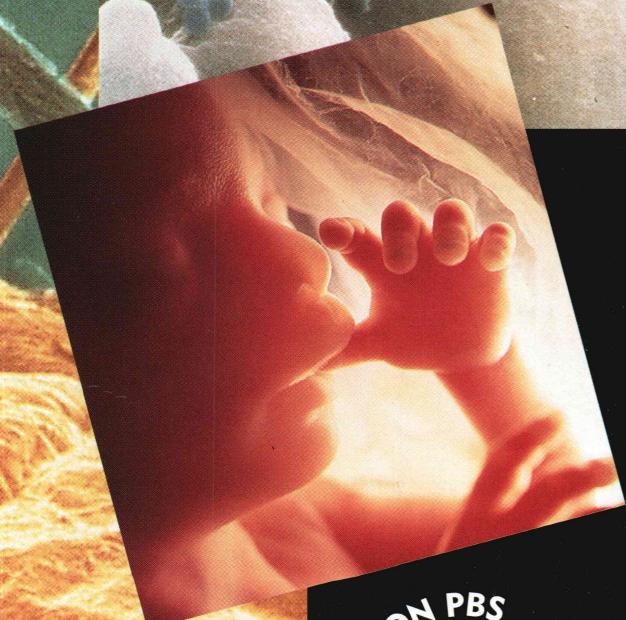
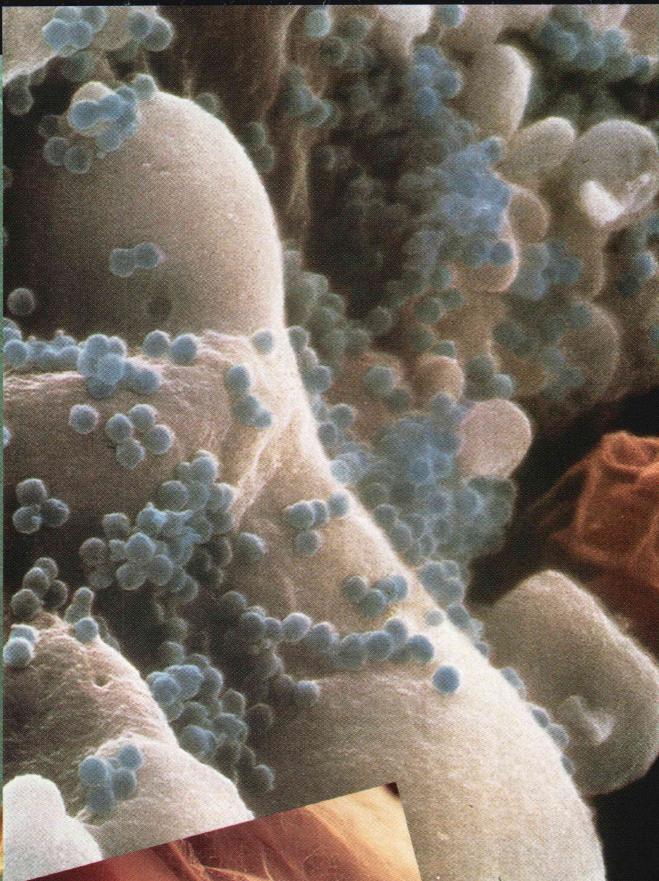
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Personal...



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The Ultimate Journey

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Monday, November 25

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Bacteria, viruses and fungi on our bodies...battling bugs in our lawns...lunching larvae in our clothes closets: Who are these invaders in our midst? All part of nature's eternal cycle of decay and renewal.

Tuesday, November 26

The Photographer's Secrets

A human egg cell during conception...a journey through the aorta...a kiss from a molar's point of view...the quivering vocal chords of a famed opera diva: Nilsson reveals how he achieves his most magical footage.

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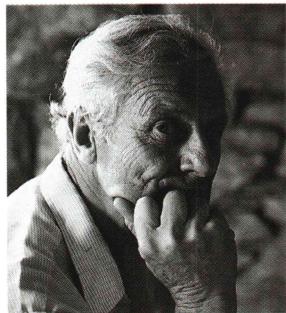
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features

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Victorians

Their soaring cupolas and elaborate gadgetry were American architecture's first true idiom. Other styles have come and gone, but the innovative optimism of these 19th-century castles still seems fiercely modern. By Peter Jensen

Hammering Out a Kitchen

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By Wendy Talarico

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An American Craftsman

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By Walt Harrington

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The Peril of Oil Tanks

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By Patricia E. Berry

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A Door in Nantucket

Nantucketers know how to put their best face forward—as witnessed by the beauty of their entries. At the fall TV project, sleuthing turns up the original doors to the house, and Norm Abram helps bring them back to life. By Jack McClintock

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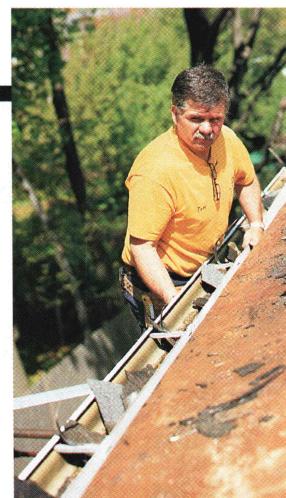
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Sometimes it's not what you put in your yard, but what you keep out, especially when it comes to deer. Plus: How to build a cold frame that will give your garden a head start and why Russ Morash prefers privet hedges.

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On the cover: Norm Abram and Morgan Bentley anticipate a completed Nantucket project house in time for the holidays. Photograph by Keller & Keller

up front

off the wall

power tool

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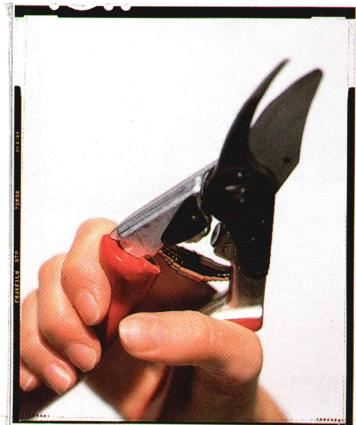
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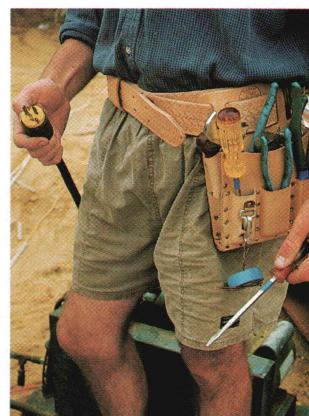
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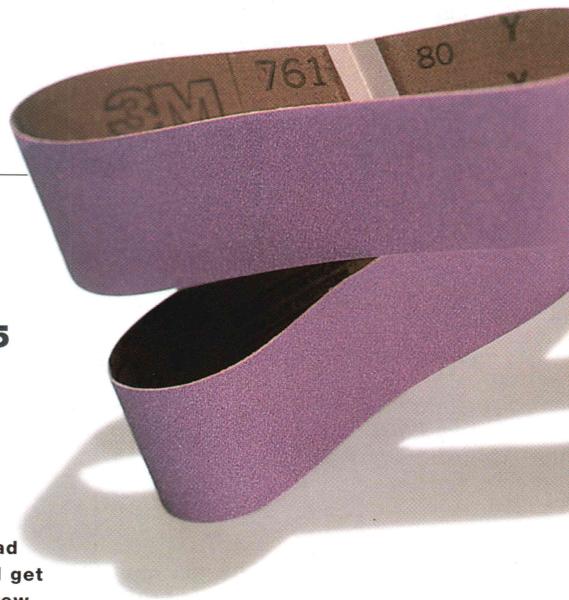
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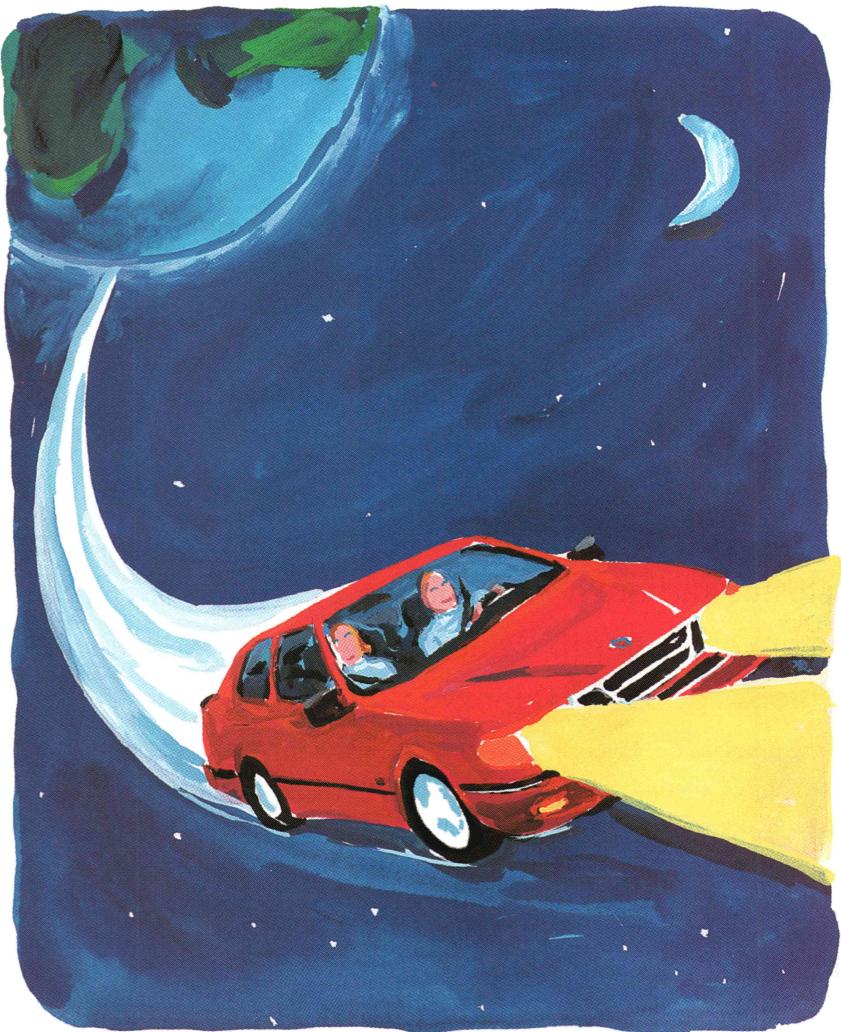
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Crackling Good

If a gas-log fire looks real, is it still fake?

BY JEANNE MARIE LASKAS



at the moment I have my head in the fireplace.

I am sprinkling a bag of fake embers around the ceramic logs perched just so on the laboratory-tested radiant heat chamber. I'm trying to pile the fake embers high enough to conceal the on/off fingertip flame control, but not so high that I can't reach it. Okay, there we go. That looks good. That looks so...natural.

Click. I turn the fireplace on. Fwoosh. I have fire. The flames dance like happy ballerinas around the Royal English Designer Oak ceramic logs. They look so...natural.

But they are fake. Everything is fake. They are gas logs. It takes some courage to admit this. Never in the name of carbon-monoxide poisoning could I have imagined myself ending up this way. But then I had my gas-log awakening. This is my testimony.

I grew up a normal suburban kid who knew good taste from bad. Good taste was the regular old boring stuff my parents did, and bad taste was the wacky but fascinating stuff other people did. Good taste was the conservative Christmas lights—red, green, red, green—that lined the roof of our ranch house. Bad taste was the flashing, wing-flapping angels and twirling Wise Men down at my friend Maria's house.

Good taste was the basic log-burning fireplace we had that went crackle, crackle, and in front of which we sipped hot chocolate. Bad taste was the one at my best friend Judy's house, which basically consisted of a red cellophane cylinder

spinning around a 60-watt bulb. It went whirr from the sound of the motor, and no one sat in front of it because there was a curled-up plastic cocker spaniel occupying that space.

I admired Judy because of these things—although not half as much as I admired Bridgett, whose mother had 14 blond wigs on mannequin heads in her bedroom. (Who says growing up in the suburbs was boring?)

Somewhere deep inside, I knew I was not a person destined to have a fake fireplace, just as I knew I wouldn't end up with wigs and twirling statues. I was raised with real-fireplace family values.

Then I became an adult with my own house. This is when things got tricky.

Okay, wait a second here. This fireplace is not right. How come these dancing flames have only one routine?

Over and over again they go leaping in exactly the same rhythm. Click. I turn the fireplace off. I reposition the radiant heat chamber so as to allow more space between logs two and four. Click. Fwoosh. No, that's not quite right either. I think back and try to remember how Kenny,

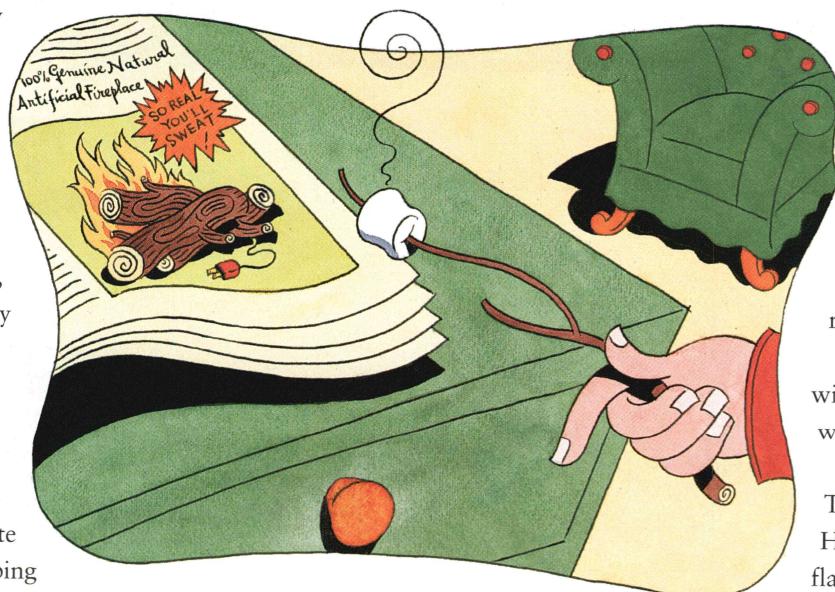


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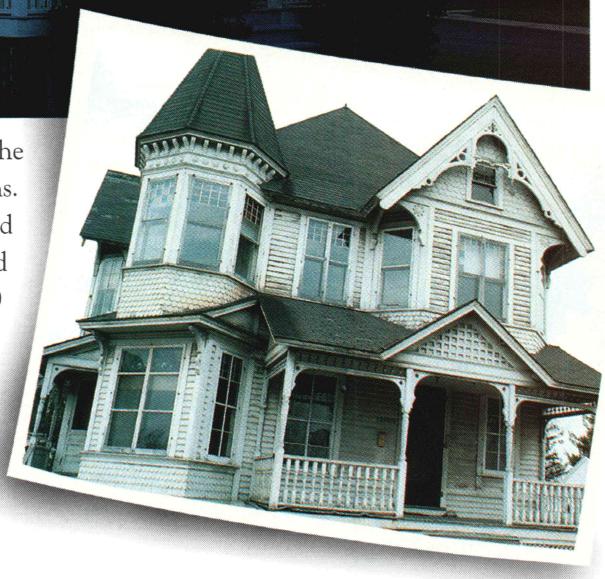


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the fireplace guy, set this thing up when he installed it last year.

Kenny did not particularly want to install gas logs in my fireplace. He had come to repair my 100-year-old chimney, which was a crumbling mess inside. The tiniest little floating ember would likely set the house ablaze, I was told by building inspectors. So for years I used the fireplace just as a decoration. I put some pretty birch logs in there and got on with my life.

But then I got into a serious wood-chopping mood. What happened was I got these new slippers, the suede moccasin kind, and a red flannel bathrobe for Christmas. I was sporting a total Eddie Bauer look—sans crackling fire in the background. It seemed a shame. I mean, if I was going to wear this outfit, I wanted a stack of firewood out back. I wanted to haul in a few logs each morning and have my coffee to the smell and crackle of a real fire.

Enter Kenny. He said sure, he could put a liner in my chimney. All he'd have to do was tear out a shower stall on the second floor and rip out a closet on the third floor and yank apart various beams in my living room ceiling. And all I'd have to do was pay him \$3,500.

"Hello?" I said to Kenny, but he could tell what I really meant was "Good-bye."

That was when he told me about the gas-log option, only when he said it, his lip sort of curled.

"You don't sound too persuasive," I said.

"Well, my boss just started carrying them, and he said we have to tell people," he said. "But myself, I like a real fireplace."

He told me that the gas logs wouldn't require a new chimney liner. No tearing up of anything. The existing chimney would make an ideal vent for the fumes. He could install the whole thing in a few hours for about \$500. So I went for it. And I did not look back. I did not think about the reaction of my family or friends when I was faced with the task of telling them that I had become a person with gas logs. I just thought: Flames in the fireplace are better than no flames in the fireplace.

Kenny did the installation. He arranged the Royal English Designer Oak logs. He sprinkled the magic embers beneath. He lit the pilot light. Fwoosh! The flames came on.

"Wow!" Kenny said. "That looks really great!" He seemed surprised. "It really does!" I said. I was surprised. We stood there together, two people sharing in a gas-log awakening.

You don't forget a moment like that. I'm wishing Kenny were here now. I don't think I'm doing a very good job with these embers. The embers, by the way, are supposed to last a lifetime—unless your cat mistakes them for cat litter. Which is what my cat, Bob, did. That's why I'm replacing them.

Hold on. All right. That's better. Click. Fwoosh. Not bad.

It's important to get it right. You never know when someone might come by who has not yet experienced his or her gas-log awakening. Someone with a mind to mock you, scorn you, make you feel stupid for getting gas logs.

Someone like my sister. Or my other sister. Or my brother.

"Gas logs?" my sister said when I made the official announcement to my family. "Ew," she said.

"Gas logs?" my other sister said.

"Gas logs?" my brother said. "Next thing you know, you'll get poodles."

Poodles? What did poodles have to do with this? "Forget it," I said. "Just forget I ever brought it up." But they didn't. They made fun of me long into the night.

About a month later my parents came to visit.

I turned on the fireplace. And right then and there it happened.

"John," my mother said. "Look at that!"

"Wow!" my father said. "Claire, I think we should get some gas logs!"

That's the thing about gas logs. They sound really stupid, but they look really beautiful.

And so two more people were awakened. My dad went out and got the Split Oak version, which I have to admit is even prettier than the Royal English Designer Oak. My sisters saw it. My nieces and nephews saw it. And bing, bing, bing, it went around the family. Everyone got converted except my brother. He says tradition is tradition.

I say tradition schmadtion. Because I now have a fire whenever I want it. I go click, fwoosh, every morning while I drink my coffee, sitting here in my Eddie Bauer outfit. I go click, fwoosh, every evening when I come home. The only thing I don't have is the crackle, crackle sound. Or the smell of burning oak. But I've gotten used to that.

So now I've told you my story. And my new embers are in place. Click. I turn off the fireplace. I put a screen in front of it to keep the cat out. I go to bed and don't think about it.

I awake the next morning to the sound of someone opening my front door. It's Celeste, the woman who cleans my house. I get dressed and go downstairs and say hello. She's all happy. She just got a new shop vac.

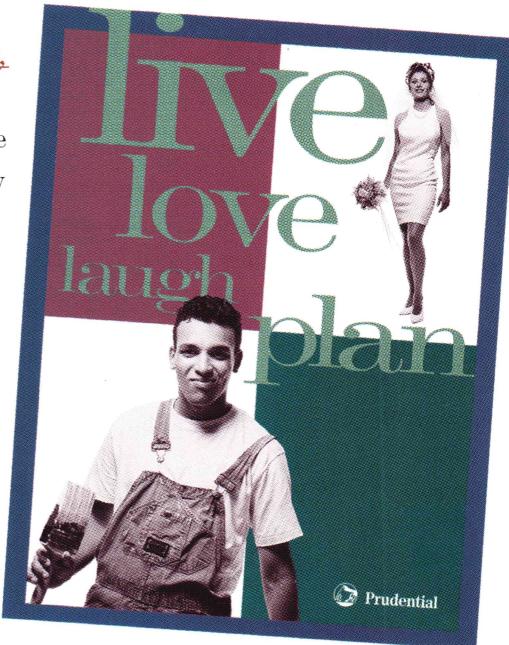
"Look what a great job it did on the fireplace!" she says.

I look. Celeste has just sucked all of my perfectly arranged fake embers into her shop vac. I don't know quite what to say. I don't say anything. I take it as a compliment that my fake embers looked real enough to fool a person who really knows dirt.

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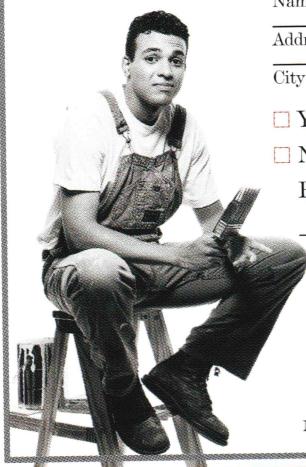
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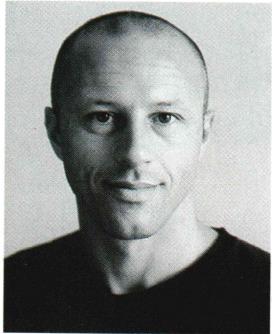


MRA 96-6676

contributors

NOVEMBER/DECEMBER

PETER JENSEN (author, "Victorians") spent the Summer of Love as a struggling art student in San Francisco, selling pen-and-ink drawings of historic houses to passing tourists along Haight Street. He went on to become an editor at *Sunset* magazine and to write five books, including *San Diego On My Mind* and *The Coast of Oregon*. His love of things Victorian includes 19th-century mining shanties: He is pictured here exploring a miner's shack in Organ Pipe National Monument in Arizona. He and his wife live in Del Mar, California. (E-mail address: ptjensen@aol.com)



"Protection Money") is a former assistant managing editor of *Sports Illustrated for Kids*. She lives with her husband and two daughters in a 1928 center-hall Colonial in Montclair, New Jersey. Her interest in writing about the problems faced by owners of old houses was

sparked by the oil-tank crisis she reports on in this issue.

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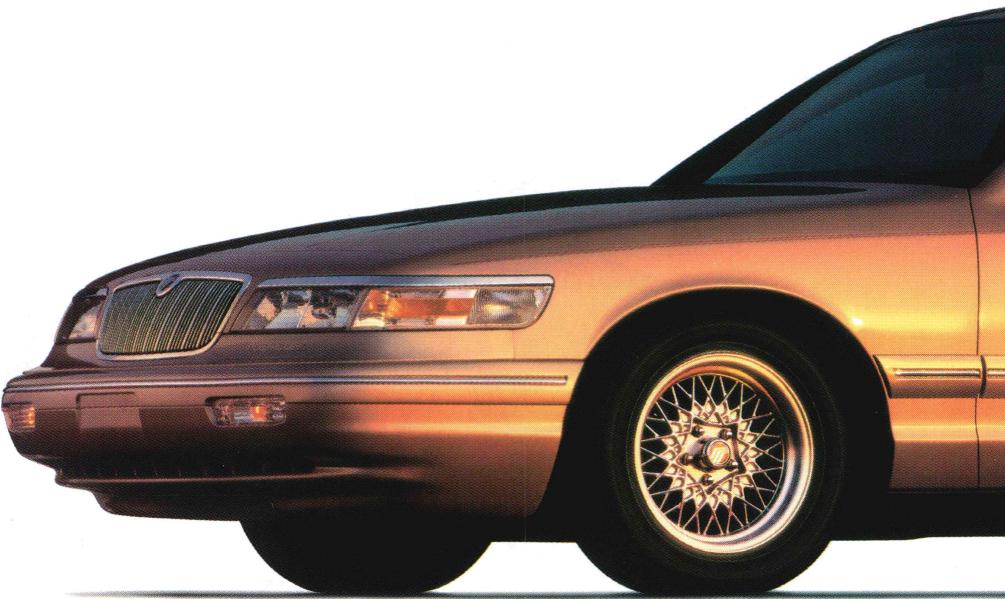


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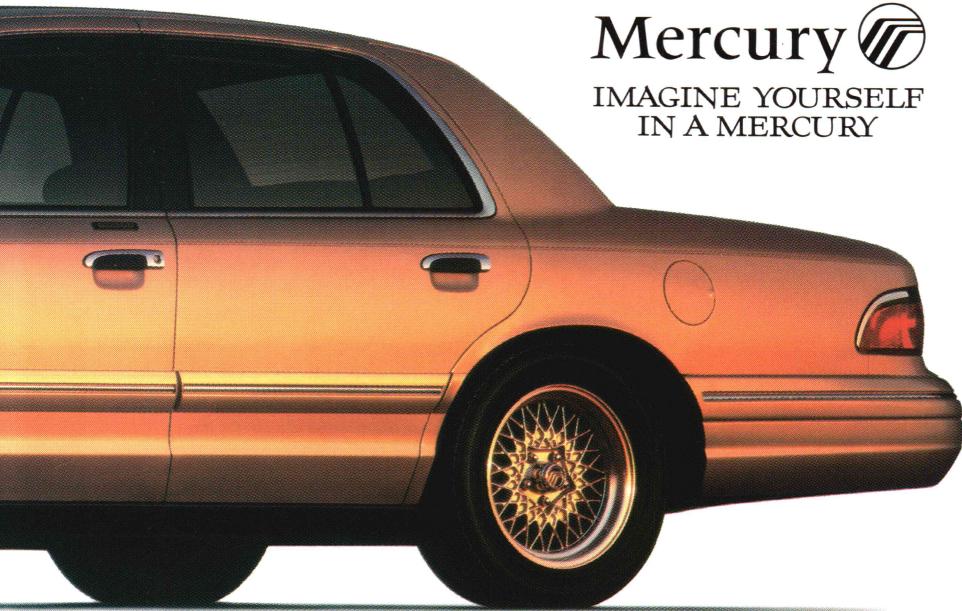


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Letters

I had a ground source heat pump installed in the fall of 1994. Prior to this, our heating source was a coal stove backed up by electric radiators. Our average electric bill was about \$85 per month, plus \$350 per season for coal. After the change to geothermal, our average electric bills nearly tripled, to about \$210 per month. Your July/August article on ground source heat suggested that I should be saving money. How can I tell if my system is working within the range of normal operating costs?

**Eric R. Endresen
Jersey Shore, PA**

Jim Bose, executive director of the International Ground Source Heat Pump Association (IGSHPA), says electricity bills for ground source heat pumps should be about a dollar a day for each 1,000 square feet of floor space heated or cooled. If your bill seems excessive, the culprit could be poor soil conditions or improper installation. Loose rocks or clay soil left around heat pump loops tend to settle and clump, creating air spaces that inhibit proper heat transfer. One solution involves digging up the heat-pump loop trench, lining it with plastic and filling air spaces with sand or water. To avoid such problems when installing a pump, choose a contractor who has completed an IGSHPA-sponsored installation course.

I was surprised to see Richard Trethewey on the cover of the July/August issue shoulder-high in a trench excavation without proper safety precautions. With a backhoe shown in the background, I can only hope Mr. Trethewey had enough common sense not to be in the trench while the vibrating equipment was operating.

**Darrell R. Barricklow Jr.
Solomon's Island, MD**

State and federal regulations dictate that any ditch more than five feet deep must have some sort of safety feature, such as sloped or stair-stepped walls, or walls held back with shields and timber or hydraulic jacks. In the case of our cover photo, the ditch for the ground source heat pump loop was only four feet

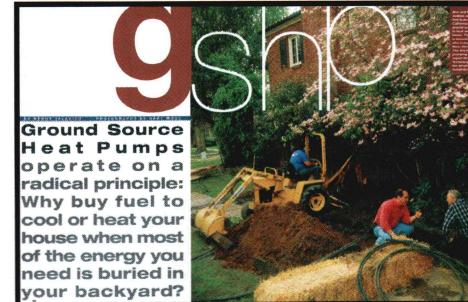
deep and posed no danger. "It might have looked deeper because of Richard's height," says Greg Schillianskey, the project contractor. "Richard's not a really tall guy." Improper shoring contributed to the more than 30 fatalities from trench accidents in the U.S. last year, according to the Occupational Health and Safety Administration.

Your May/June Extras article on peat moss ("Save the Bogs") was misleading when it said that "every year, more than 40,000 acres of the crumbly brown stuff are strip-mined from sphagnum moss bogs in Canada and the United States." We do not harvest 40,000 acres each year; rather, less than 40,000 acres have been opened

for harvesting over the 60-year life of the industry.

**Gerry Hood, president
Canadian Sphagnum
Peat Moss Association
Alberta, Canada**

Mr. Hood is correct in stating that just under 40,000 acres is the total amount of land devoted to peat harvesting. Although peat moss regenerates quickly enough to be considered a renewable resource, the World Wildlife Fund says habitat loss from these 39,500 acres—a small percentage of Canada's 270 million acres of peat bogs—is still a concern. "Peat bogs are very specific ecosystems because they're so acidic," says Constance Hunt, director of the fund's Freshwater Ecosystem Conservation program. "They support plant life found nowhere else



and take hundreds of years to regenerate. In terms of biodiversity, loss of peat bogs is pretty significant." Other ecological concerns include the release of carbon dioxide into the atmosphere and the possible pollution of aquatic areas downstream from harvest sites.

How might I go about locating an apprenticeship in old-home restoration?

**Heather Bartels
via E-mail**

Try calling your state's department of labor, employment or human resources: Almost all construction-related occupations have formal apprenticeships. Usually sponsored by employers with support from schools and government agencies, these four-year programs provide technical knowledge and hands-on skills to 150,000 people each year. Norm Abram, who was trained on the job by his father, supports the idea. "Because the construction trade is getting more technical, it's important to learn not only the manual skills but the textbook and technical sides too."

p u n c h l i s t

i s t

definition: a list of items incorrectly done or remaining to be fixed on a construction job

•The illustration on page 7 of the September/October issue was improperly credited.

The artist is Robert Neubecker.

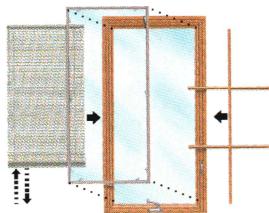
•The price of the Better Tools Banana utility knife, pictured on page 15 of the September/October issue, was incorrect. The knife retails for \$8.95.

•A photograph on page 83 of the May/June issue was incorrectly identified. The house we placed in Pass Christian, Mississippi, is in fact in the historic district of Beaufort, South Carolina.

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extras

cool junior tools

Popsicle-stick creations may be all right for kids who are content to build ornaments, but budding woodworkers deserve real tools and good, solid chunks of wood for their projects. Most tools sold by toy companies are too flimsy for useful woodworking projects like birdhouses and step stools. Buy real tools for your child, but consider lengths and weights little hands can manage and plan on being there to supervise. Saws should be sharp to prevent frustration, but for safety, insist that children put wood in a vise and keep both hands on the saw. Young children will have greater success shaping wood with a rasp or a spokeshave. Kids love power tools, but most should wait until age 8 before using a power drill or a random-orbit sander, says Louise Bruin, who teaches woodworking to elementary school children in Cambridge, Massachusetts. At 10, she says, some kids are ready for a drill press. Round out a junior tool kit with clamps, nails and screws, a nailset, screwdrivers, tape measure, glue, sandpaper and latex paint in bright colors.



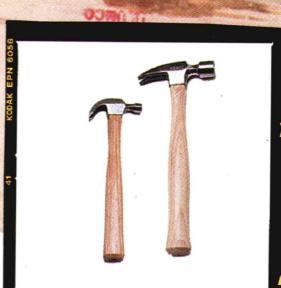
Tool belt: Essential for the Norm/Norma look. The one at right comes with a flashlight, hammer, tape measure and torpedo level.



Hand drill: The egg-beater design works with small-diameter bits. For larger holes, use a brace.



Coping saw: Good for curves. For cutouts, remove the blade, thread it through a hole in the wood, then reattach blade to handle.

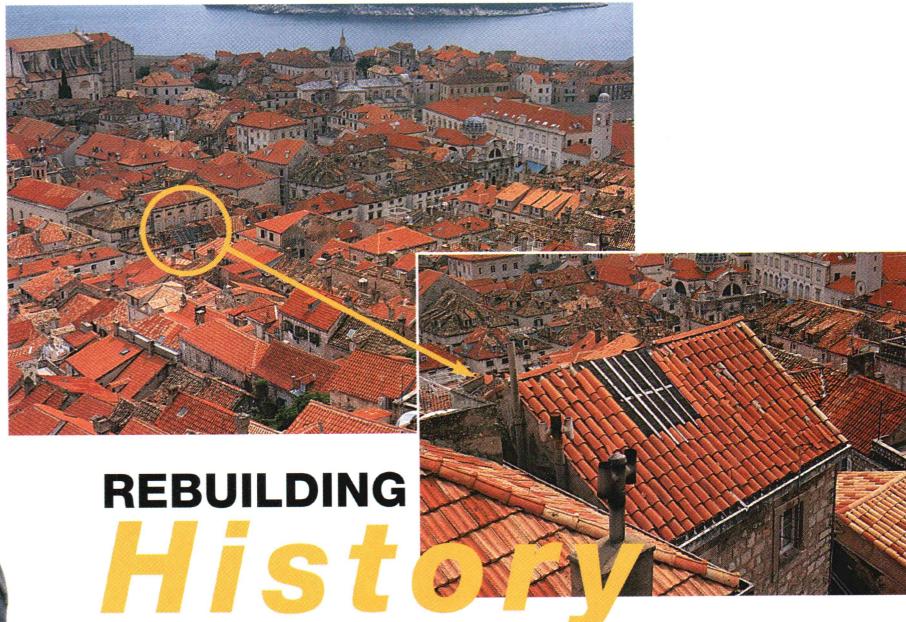


Hammer: The 5-ounce model at left is good for kindergarteners. Older kids will pound nails faster with the 10-ouncer.

"Every house should begin **on the ground**, not **in the ground**."

Frank Lloyd Wright

Goggles are essential when kids smash rocks or graduate to power drills and sanders. A torpedo level fits in a kid-size tool belt.



In 1991, hundreds of houses in the ancient Adriatic seaport of Dubrovnik were decimated by Serbian and Montenegrin artillery. Today, reconstruction is under way in the now peaceful city. To speed rebuilding, the Institute for the Restoration of Dubrovnik offers homeowners free replacement roof tiles. Those who want to help from afar can join the Institute's Buy-a-Tile campaign. The minimum contribution is \$10 (tax-deductible). Donors get certificates showing they helped restore a city where streets are paved in marble.



Compass saw: Better for kids than a crosscut saw, it's easy to use with two hands and cuts quickly. A coating on the blade helps the saw glide in the kerf.



Spokeshave: Even young children can handle this tool. Plane: Sized for kids, this model uses cutters similar to razor blades.



marble-ized

Those who never quite outgrew their passion for marbles will be fascinated by Lightscreen panels—metal grids that trap marbles loosely like a ball-bearing housing holds steelies. Assembled (each interlocking panel is 12 inches square), they make intriguing privacy screens, tabletops and door inserts. Other possibilities are limited only by imagination—they even work decently as foot massagers.

Take It for Granite

Recycled newspapers and soy flour seem unlikely ingredients for a building product, but Phenix Biocomposites, a Minnesota-based company, has found a way to combine the two to yield a smooth, hard board called Environ that is suitable for anything from tabletops to panel inserts in cabinets. Soon to come: wall tiles and moldings. Six of the 10 colors take on the look of granite with just a few coats of clear finish. That's because the manufacturers add bits of color to the newspapers, giving the composite a speckled grain that simulates stone. Woodworkers report that the mixture of glue and newsprint cuts easily, with no fuzz or chipping.



curvy trim

Flexible plastic moldings do 360s without breaking or deforming—more than can be said for wood, which must be steamed, kerfed, laminated or otherwise beaten into submission. The cost per lineal foot is higher than wood, but the plastic can simply be nailed or screwed in place, saving some labor costs.



Attention, Spineless

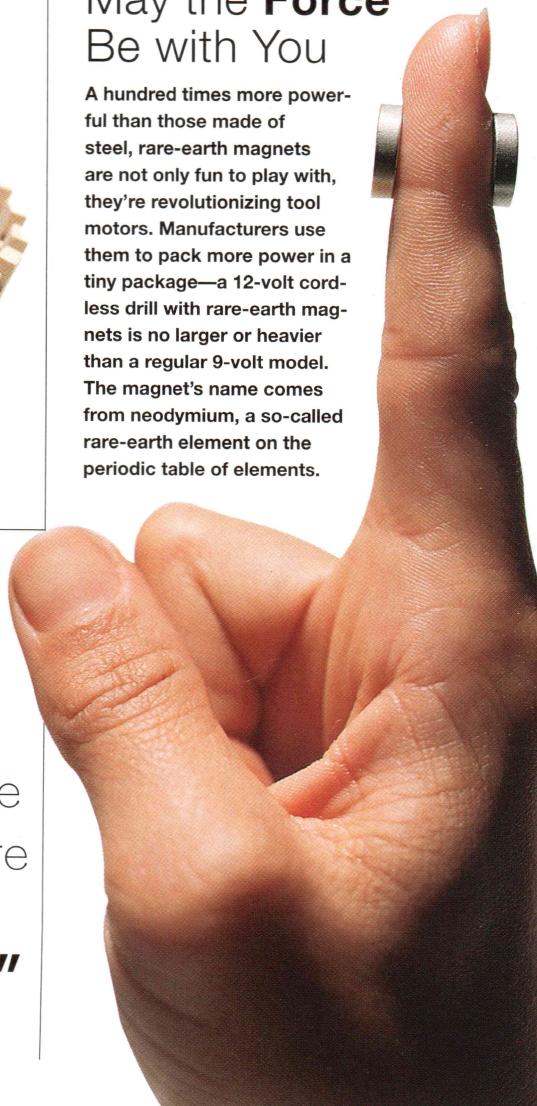
Seeking an instant library, one former U.S. senator is reported to have made faux books by painting wood blocks to look like spines, then shelving them as if they were real. Interior decorators buy books in bulk with the same goal—to fill shelves and make the owners look erudite. That's why Half Price Books in Dallas sells tomes by the yard. The jumble of volumes may include obsolete technical manuals, old textbooks and a foot or two of fiction that's gone unnoticed. "We appeal to a lot of different people because the books do," says Kathy Doyle Thomas, vice president of marketing. Besides using the books to build libraries, some customers have discovered they can be stacked to make lamp bases.

"In most old houses, the rooms that need the most work are **kitchens and baths.**"

Steve Thomas

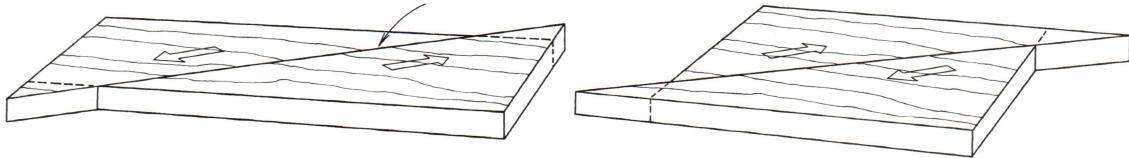
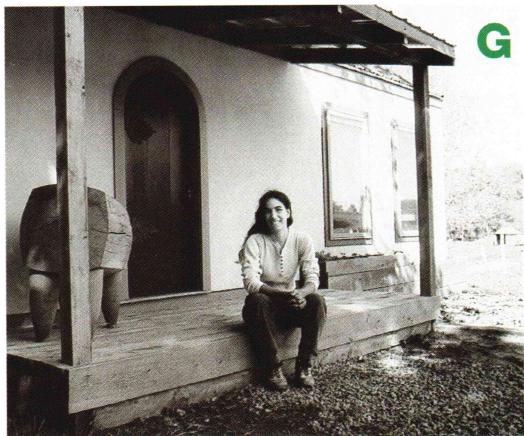
May the Force Be with You

A hundred times more powerful than those made of steel, rare-earth magnets are not only fun to play with, they're revolutionizing tool motors. Manufacturers use them to pack more power in a tiny package—a 12-volt cordless drill with rare-earth magnets is no larger or heavier than a regular 9-volt model. The magnet's name comes from neodymium, a so-called rare-earth element on the periodic table of elements.



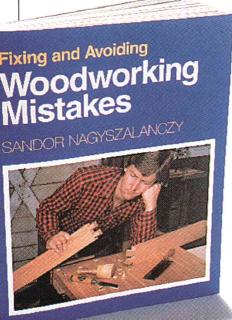
GREAT DORMS, PART 1

Building a house isn't really all that different from creating a sculpture. "You need good materials, good design sense and a strong back," says Alfred University graduate student and sculptor Zoe Strecker. When she moved to rural Alfred, New York, she decided to test out her theories. The result is a small timber-frame home that can be moved by a tractor-trailer. Strecker framed the house with fragrant red-cedar logs she cut from her family's farm in Kentucky. The walls are made from stress-skin panels (particleboard sandwiches with foam insulation in the middle). The exterior is coated with latex stucco, a finish that is flexible enough to absorb road bumps and sudden stops. The 240-square-foot interior contains a seating area, a loft, a full kitchen, a laundry area and a bath. The total cost to build this portable house was \$12,000—about \$50 a square foot, including all the appliances. Until she finishes her degree in ceramic art, Strecker will keep her home parked in a cow pasture near the university. After graduation, she may move it to another part of the country and live in it while installing her sculptures.



Making Mistakes Gracefully

Any do-it-yourselfer who wants to cut down on the inevitable goof-ups that occur when working with wood ought to do two things: Remember Norm Abram's advice to measure twice before cutting anything, and read *Fixing and Avoiding Woodworking Mistakes* by Sandor Nagyszalanczy. His suggestions for how to think through projects in advance to avoid mistakes will save a lot of expensive lumber. Chapters deal with raising dents, filling gouges, flattening warped wood and repairing a crummy finishing job. One of our favorite tips: Do a dry run before gluing up to ensure that everything fits and that the last piece will slip into place effortlessly. The best of the bunch is the author's idea for how to stretch a board to make it longer or wider (see illustrations above). Now if he could only give us a way to stretch a board lengthwise and crosswise at the same time.



FITS IN THE SHOP WALL

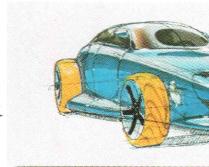
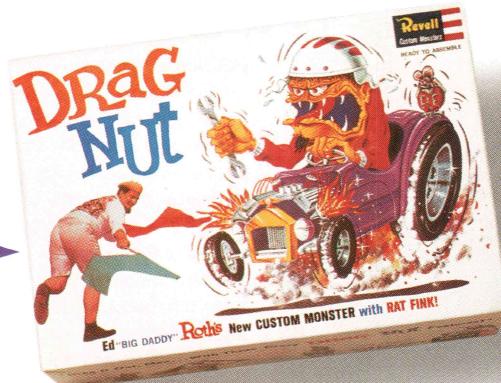
The new Mister Miser urinal uses less water than the stingiest toilets—only 10 ounces per flush. Although it looks a bit like a hospital fixture, it's a good alternative for a woodshop, a garage or other domains where there's no room or need for a full-size flusher. The unit folds into the wall when not in use, weighs just 6½ pounds and is compact enough to slip between studs spaced at the standard 16 inches on center.



Venting Frustration

Residents of the humid Southeast should think twice about venting their roofs. That's the advice of the American Society of Heating, Refrigeration and Air-Conditioning Engineers, a group that sets guidelines for home construction. After 50 years of endorsing roof ventilation in every climate, the group, in its soon-to-be-released handbook, says soffit and ridge vents in warm, moist locales may actually suck moisture into the attic rather than remove it. Research from several other sources suggests soffit and ridge vents may not be as effective at bringing in air as manufacturers claim. One study found that some vents let in 80 percent less air than previously thought. Furthermore, the 1:300 ratio of vent space to roof area adhered to by builders and designers since the 1940s has been "accepted without any scientific substantiation," says Bill Rose, a research architect for the University of Illinois Building Research Council. "It's an arbitrary figure that somehow became code."

A
CAR
IS
BORN.



May 15, 1990:
Inspired by childhood memories,
a designer at Pacifica, Chrysler's California
design studio, scribbles the words
"production hot rod" on a 3"x 5" card.

August 13, 1990:
Designer walks
colleague's office
with loose sketches
21st century open
roadster. That evening
a group gathers to
discuss how it could be

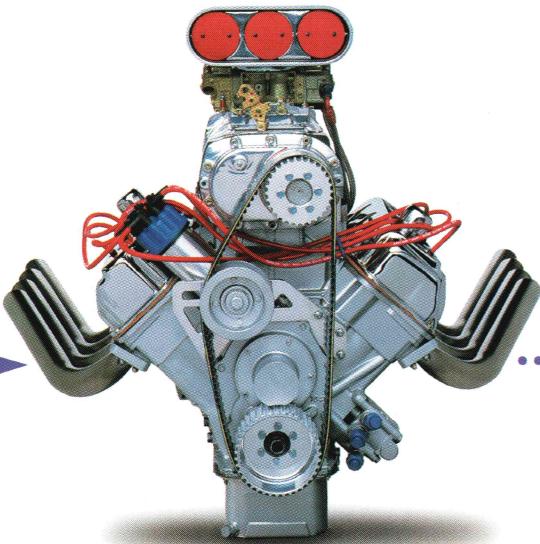


February 1, 1996:
"The only action more outrageous than
creating a Prowler show car is building copies for sale
to the public. Proving that this is not your average
car company, Chrysler Corporation intends to do just
that." - Motor Trend, February 1996

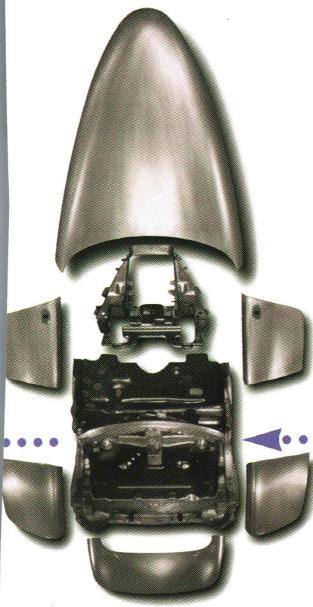
January 10, 1996:
Wearing shades à la Jake and Elwood,
Chrysler Chairman Bob Eaton
and Bob Lutz wheel Prowler prototype
at Detroit Auto Show to announce
that it will become a limited
production 1997 Plymouth.

What's the point of building an outrageously cool concept car if the closest anyone can get to it is behind a velvet rope at some auto show? That's what we thought too. At Chrysler Corporation, concept

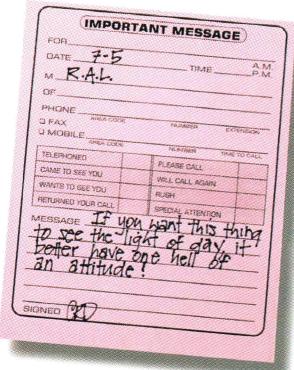
vehicles aren't just exercises in corporate vanity. They're laboratories for testing new ideas. When people respond to those ideas, we pay attention. Sometimes we incorporate them into your next



September 18, 1990:
Chrysler Design Chief Tom Gale starts work on his own custom street rod.



April 15, 1995:
First prototype body parts, fabricated entirely from aluminum, are delivered.



May 9, 1991:
Chrysler top management gets wind of project. Message from President Bob Lutz: "If you want this to see the light of day, it better have one hell of an attitude."



May 20, 1991:
Lutz is shown scale model of concept car. Grinning, he agrees with recommendation to build full-size version. Project is named "Prowler."



January 7, 1993:
Prowler show car draws huge crowds at Detroit Auto Show, followed by impassioned pleas to put it into production.



May 10, 1992:
Chrysler team travels to the NSRA Street Rod Nationals for research, inspiration, and rousing performance by Peter Noone and Herman's Hermits.

truck, sport utility, or minivan. And sometimes we actually produce that heart-stopping design you saw on the stand. It's what you do when great cars are what you're about.

GREAT CARS. 
CHRYSLER CORPORATION

L A S E R L E V E L

There are lots of laser levels out there, but all of them rely on the user to actually get the device leveled, usually with a bubble. Not the tape-measure-size LeveLite, which simultaneously projects two beams—one vertical, the other horizontal—without any adjustment. The secret is its pendulum-hung laser, held plumb by gravity. Just set the level down and a brilliant ruby-red dot appears on the wall at the same height anywhere in the room, a real help when installing cabinets and molding. LeveLite's beams, which are accurate to a quarter-inch over 40 feet, remain level and plumb as long as the case is within 4 degrees of vertical. (If the beam jiggles when the case is tapped, the pendulum is working fine.) Flip the case on its side, and the beams remain exactly 90 degrees apart, useful for tiling floors or laying out foundations. The tool's only apparent drawback is one common to other laser levels: Its beams are hard to see in bright sunlight.

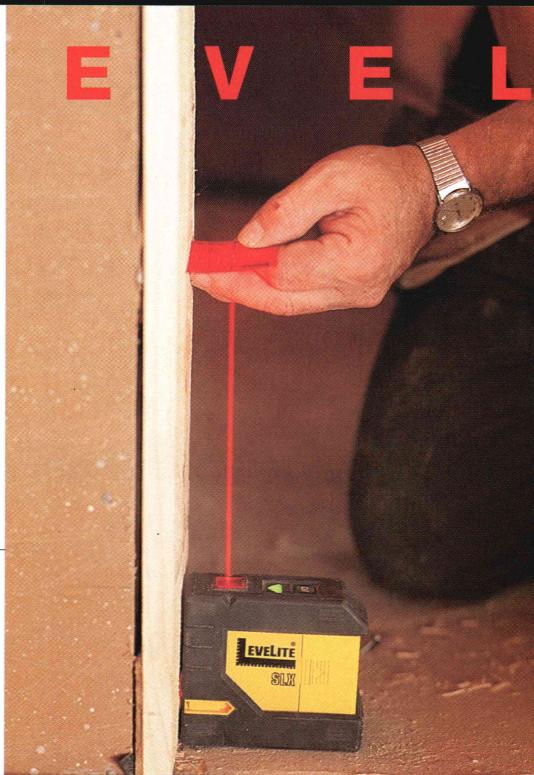
P u b l i c A p p e a r a n c e s

NORM ABRAM

November 15-17 in Indianapolis, IN. The Remodelers' Show at Indiana Convention Center. Call 202-861-2106 for information; 800-736-6306 for automated fax-request system.

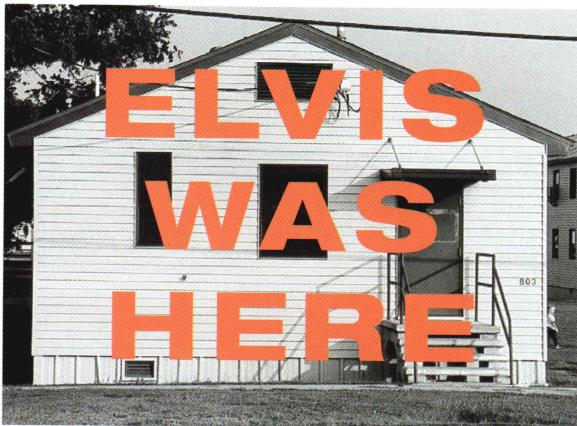
STEVE THOMAS

November 2-3 in Reston, VA. Home Specialty Store opening, 703-709-5757.



On-Line Lumber

"Woods of the World" CD-ROM is a paperless way to read about trees. Pictures, maps and movie clips accompany a database that covers up to 1,000 wood varieties and their properties. The disc comes with an Internet directory, which works with an Internet connection to locate more than 2,000 related Web sites, indexed by category for less surfing. Proceeds go to Tree Talk, a nonprofit organization for sustainable wood harvesting. The software runs on both Macintosh and PC platforms.



Fort Chaffee, Arkansas, is hardly a lightning-response combat base. Used mostly for training, it's deserted by uniformed personnel whenever there's a football game at the local high school, and some of the buildings look as if no one's cared for them since the 1960s.

But that's about to change. Jan Honeycutt's fourth- through sixth-grade classes in the city of Fort Smith care very much about one building in particular: No. 803. In that structure, Private Presley, Elvis Aaron, Serial No. US53310761, reported for duty. And on its floor America's best-loved pompadour fell, the victim of an army barber's electric clippers.

That was 1958; Elvis would go on to bigger things and Fort Chaffee to smaller. The shearing of the king was forgotten. And now some Washington cost-cutters have noticed Fort Chaffee. The base, including the impromptu barbershop, is to be taken over by the Arkansas National Guard next fall.

Honeycutt's students want building 803 preserved, perhaps made into a shrine. They're even leading an effort to determine what chair Elvis sat in. Fans will surely want to visit, they say. Elvis himself, if he is indeed still at large, might want to see the place again too.

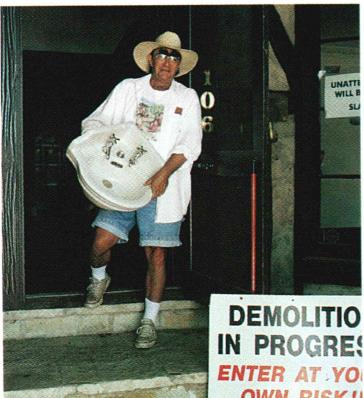
power plant

Diesel cogeneration systems have been used in heavy industry for years but are just now being introduced in houses. A typical system consists of an oil-powered engine that runs a five-kilowatt generator. The combo is noisy and must be housed in an insulated box, but it can do three remarkable things at once: produce electricity for household use, warm a house with waste heat captured from the engine and feed excess electricity back into the grid of the local electric company, which is required by federal law to buy it. The systems are far from perfect—only about 80 units have been placed nationwide (wind and solar aficionados, on the other hand, have been selling excess juice to utilities for years). System costs are high now—about \$10,000 installed. But expected increases in energy costs over the next few decades could make cogeneration more feasible. Payback will come soonest for those who are heating their homes with electricity.

extras

"The architect is an artist or he is nothing."

Robert A.M. Stern

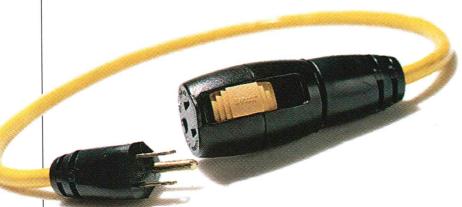


RUST BUSTER

Erase corrosion fast with this sanding block. Unlike foam pads with an abrasive coating, Sandflex is rubber impregnated with an abrasive. It's long-lasting and can be carved to fit rounded railings. Dribble oil or water onto the block for best results.

Take My Pipes, Please

Building a house is expensive, but so is tearing one down. Landfill fees are steep. What's really a shame is that much of the rubble is usable. That's why self-described "dead-broke homeowner" Jodi Murphy formed the Homewreckers Club, 750 Chicagoans in search of old houses to pillage. Murphy finds houses ready for demolition and convinces the owners to hold an auction first. Club members arrive at 8:30 a.m. to vet the contents—everything from lawn statues to floorboards and sinks may be up for grabs. At 9 a.m. the bidding begins. Prices are low, but there's a catch: The purchaser has to rip out or dig up the goods by sundown.

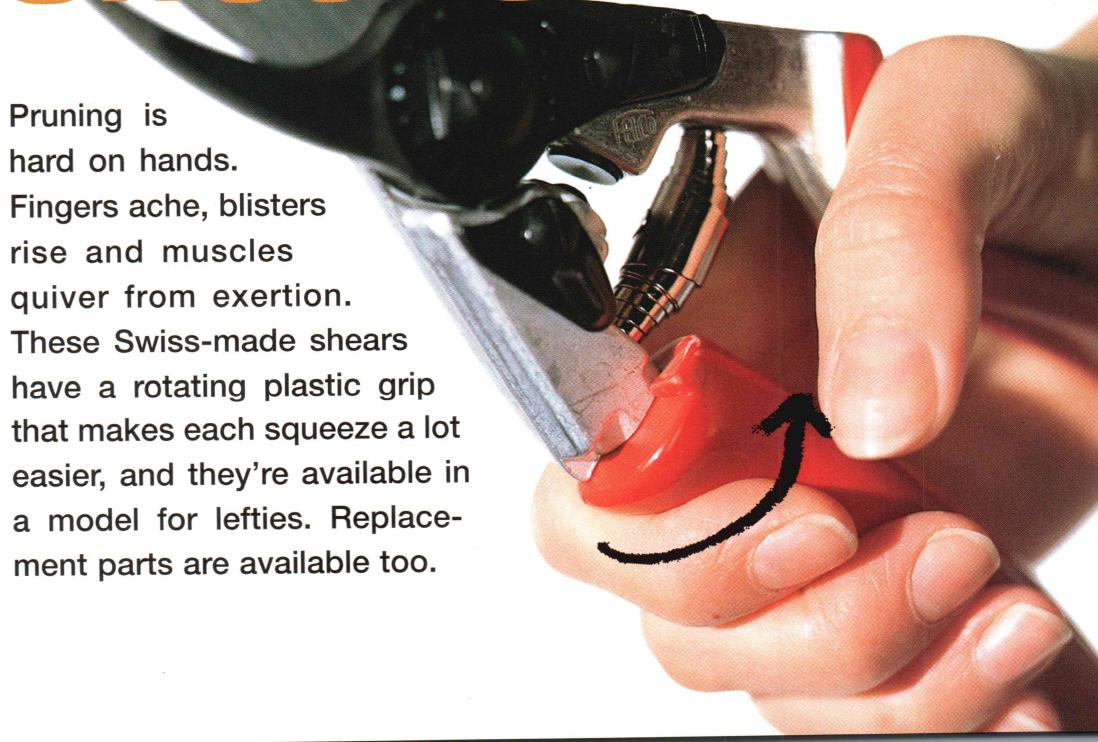


A Plug That Stays Wired

Shortly after the extension cord article appeared in the September/October issue, staffers discovered a new type of cord worth knowing about. The Lock-Jaw extension cord has a pull slide that, when slipped into position, holds the plug in a friction grip no amount of yanking and tugging will release. The cord itself is a tough customer too, with flexible, tightly spiraled wires armored in yellow plastic.

rolling shears

Pruning is hard on hands. Fingers ache, blisters rise and muscles quiver from exertion. These Swiss-made shears have a rotating plastic grip that makes each squeeze a lot easier, and they're available in a model for lefties. Replacement parts are available too.



Sand and Deliver

A belt sander strips and flattens with single-minded savagery

BY MARK FEIRER PHOTOGRAHPS BY MARTIN MISTRETTA

here's the problem: A room contains 12 tables. Every table has four legs; every leg has three birch pegs glued into it, and every peg sticks out half

an inch. How long will it take *This Old House* contractor Tom Silva to make all the pegs flush?

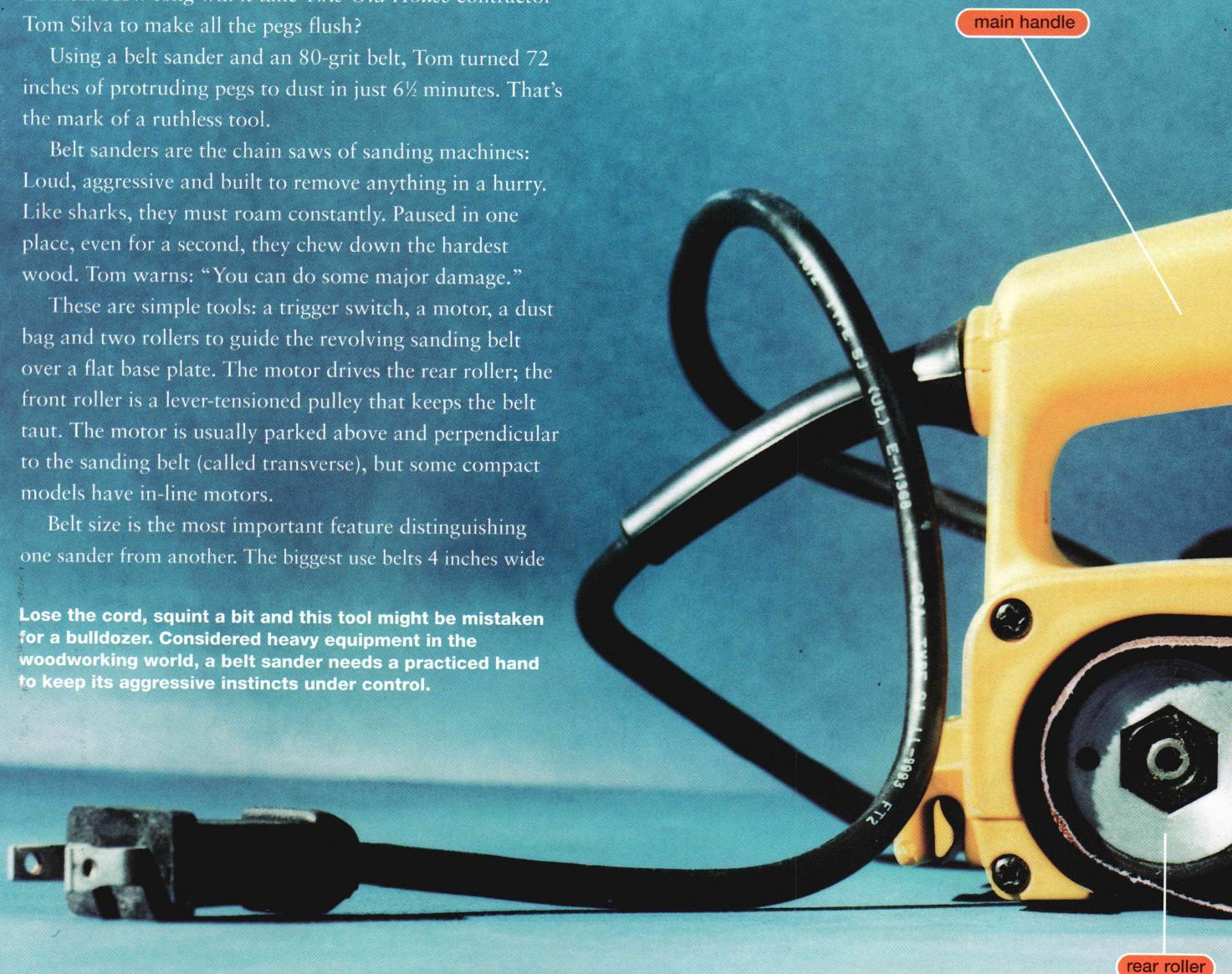
Using a belt sander and an 80-grit belt, Tom turned 72 inches of protruding pegs to dust in just 6½ minutes. That's the mark of a ruthless tool.

Belt sanders are the chain saws of sanding machines: Loud, aggressive and built to remove anything in a hurry. Like sharks, they must roam constantly. Paused in one place, even for a second, they chew down the hardest wood. Tom warns: "You can do some major damage."

These are simple tools: a trigger switch, a motor, a dust bag and two rollers to guide the revolving sanding belt over a flat base plate. The motor drives the rear roller; the front roller is a lever-tensioned pulley that keeps the belt taut. The motor is usually parked above and perpendicular to the sanding belt (called transverse), but some compact models have in-line motors.

Belt size is the most important feature distinguishing one sander from another. The biggest use belts 4 inches wide

Lose the cord, squint a bit and this tool might be mistaken for a bulldozer. Considered heavy equipment in the woodworking world, a belt sander needs a practiced hand to keep its aggressive instincts under control.



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AUXILIARY KNOB: A hand here helps the sander stay on the work.

BASE PLATE: Also called wear plate or shoe, this flat surface presses the sanding belt against the work.

BELT-RELEASE LEVER: Tensions the belt while the sander is in use; releases tension for belt removal.

DUST BAG: Collects sawdust and paint kicked up by sanding. Empty regularly, or better yet, hook sander directly to shop vac.

MAIN HANDLE: A hand here controls tool movement and direction.

ROLLERS: The rear roller is linked to the sander's motor with a drive belt or chain. The front roller freewheels.

SANDING BELT: A loop of abrasive paper or cloth that comes in several widths, lengths and grits.

TRIGGER SWITCH: Turns the sander on and off; a lock button keeps the sander going without pressure on the switch. Some switches are linked to variable-speed controls.



and 24 inches in circumference, but there also are 4-by-21, 3-by-24, 3-by-21 and even diminutive 3-by-18 models, as well as a few specialty sanders with belts barely an inch wide. Tom Silva prefers broad 4-by-24 brutes that can rip through decades of paint, grind off nail heads or level wide swaths of wood. These muscle machines are heavy—some tip the scales at up to 15 pounds—but for Tom, that isn't always a concern. He can usually flop work across a couple of sawhorses and let the sander's weight do the work as he steers.

Norm Abram prefers a small sander for its maneuverability. "When you're trying to sand door casings without taking them off the jambs," he says, "a 3-by-21 is nice." It may weigh less than six pounds, light enough to sand one-handed. Clamped to a workbench or upended on a special stand, any belt sander can be turned into a stationary tool, good for trimming miters and sizing small pieces of wood.

"The only way to know which one's



Intended for close-quarters work and dandy for deck detailing, this sander has a belt only 1½ inches wide. A removable handle allows it to sneak into places other sanders rarely go.

Dust bags on belt sanders make breathing easier. Most mount alongside the tool, but some mount at the top to swivel clear of the work. Many sanders can also be attached to a shop vac.



right for you," Tom says, "is to heft a bunch of 'em." Pick a sander, install the dust bag, then move the tool back and forth as if sanding a tabletop. Tip it sideways and sand the table's edges, then round over a sharp corner. Now try another. Check the feel of the handles as the tool's position changes, and see if the dust bag gets in the way. Install and remove a real sanding belt too; some belt-release levers are uncomfortably stiff.

Belt sanders are first-class generators of sawdust, a known health risk. Dust bags help but can choke trying to keep up with super-coarse belts. Tom hooks his sander to a shop vac whenever possible, even for less demanding applications. He finds vacuum-assisted belts clog less, so they're able to cut faster; they also throw



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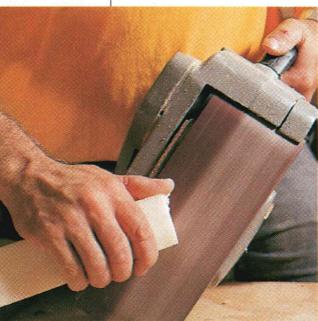
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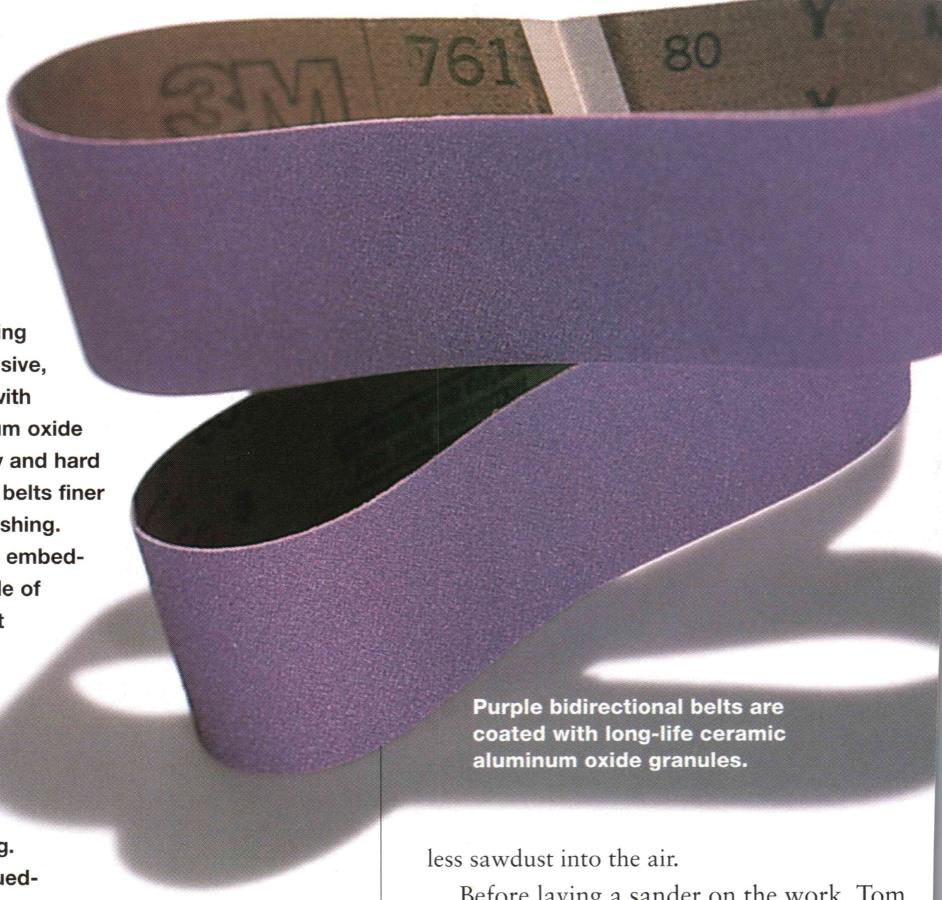
A sanding belt's work is done by legions of tiny, chisel-sharp abrasive granules, or grit, graded by size from super-coarse 24 grit to silky 320. Closed-coat belts pack the grit tightly; they're best for sanding metal and hardwoods. Open-coat belts space out the grit to reduce clogging and so work better on soft, pitchy woods like pine and for stripping paint. Aluminum-oxide grit, typically the least expensive, is good for general-duty wood sanding. New belts with alumina-zirconia (the blue belts) or ceramic aluminum oxide (the purple ones) remain sharp longer but are pricey and hard to find in grits much finer than 120. Tom never uses belts finer than 150 grit; he uses a random-orbit sander for finishing.

All sanding-belt abrasives are embedded in resin atop a backing made of paper or cloth. Paper belts don't last. The best belts are cloth, either tightly woven cotton, polyester or a blend of the two. Polyester is more durable than pure cotton, but belt makers don't always identify the backing.

Until recently, all belts had glued-and-lapped joints that are lumpy. They self-destruct unless they turn in the proper direction (arrows inside the belt show which way they're supposed to rotate). New bidirectional belts have lump-free, taped joints that can be run in either direction. They also last 10 to 15 percent longer and tend to sand smoother than old-style belts. A worn or clogged belt has lousy traction. Tom knows it's time to clean or replace a belt when he doesn't have to rein in his sander as much.



When grit clogs, Tom Silva erases the residue with a rubber cleaner held against the belt. He makes sure to keep his fingers clear.



Purple bidirectional belts are coated with long-life ceramic aluminum oxide granules.

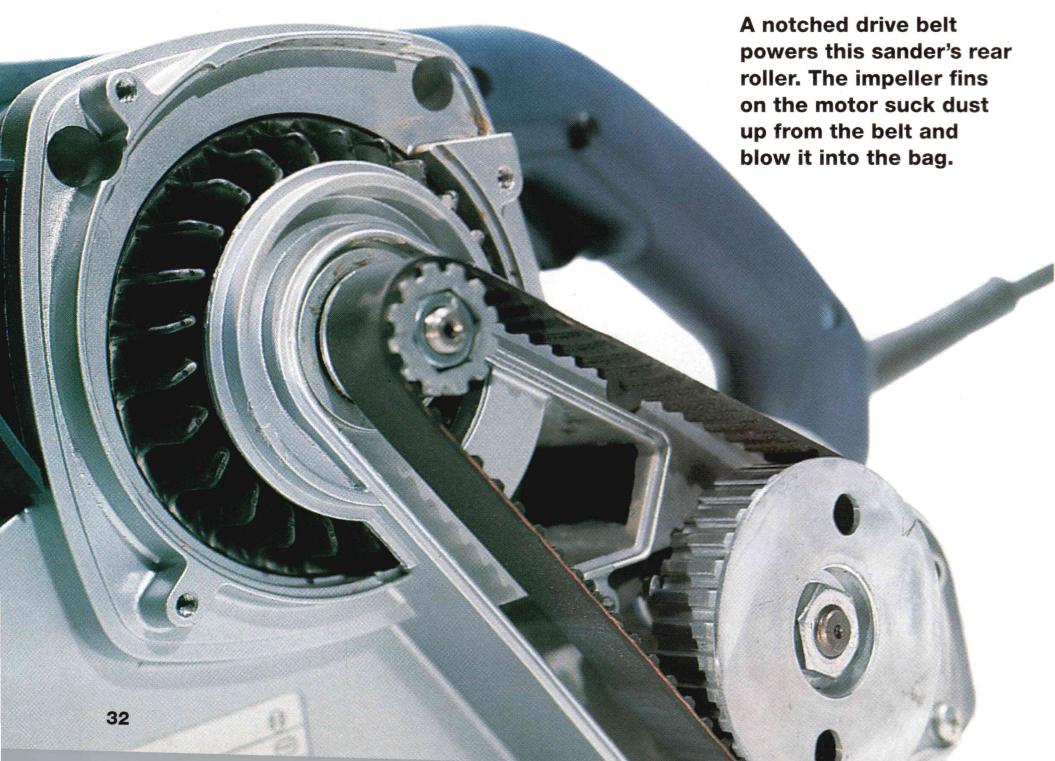
less sawdust into the air.

Before laying a sander on the work, Tom always checks how the belt is tracking over the base plate. If a belt wanders, he slowly turns the tracking knob as the sander is running until the belt is centered over the plate and stays there. It isn't necessary to do this often; Tom tracks his tool only when switching belts.

Belt sanders haven't changed much in recent years. Motors are lighter and more powerful, and dust bags have been added. Some sanders now have automatic belt tracking and variable speeds. Tom, who prizes technique over technology, believes belt sanders should be simple and straightforward. "I can't really see the use of more than one speed," he says. His advice: Don't work a surface so hard that it heats up, and don't belt-sand veneer.

Most problems occur when sanders are pressed hard. Norm Abram says, "It takes a fair amount of practice to use a belt sander, because the portion of the belt under the plate is so small in relation to the rest of the tool." But once you know how to drive one, this bulldozer of a tool can be manipulated like a sports car, delivering smooth, stripped wood—fast.

A notched drive belt powers this sander's rear roller. The impeller fins on the motor suck dust up from the belt and blow it into the bag.



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Belt Ways

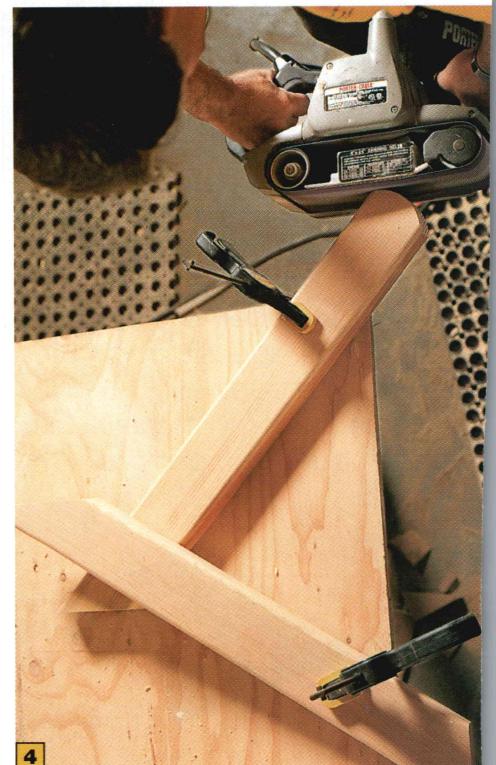
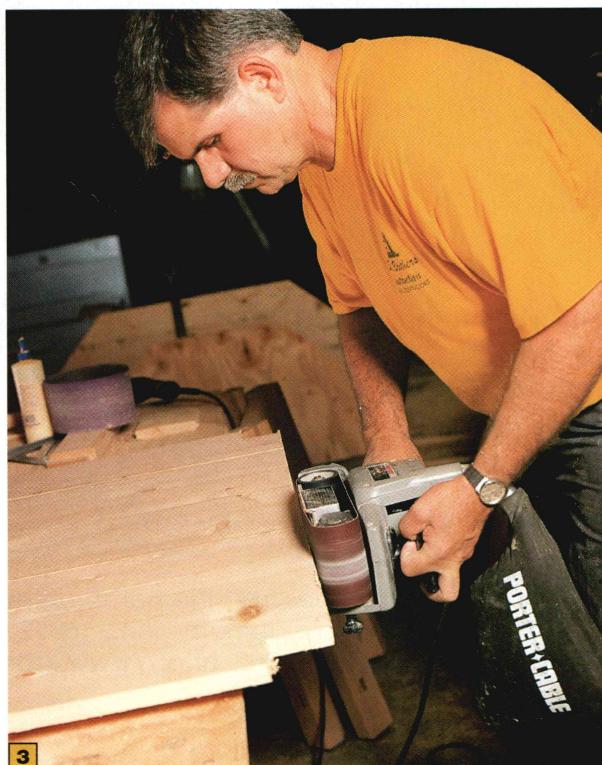
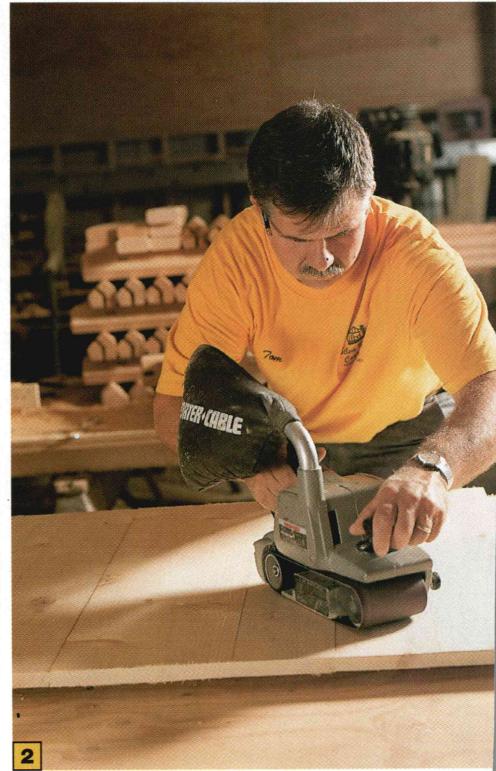
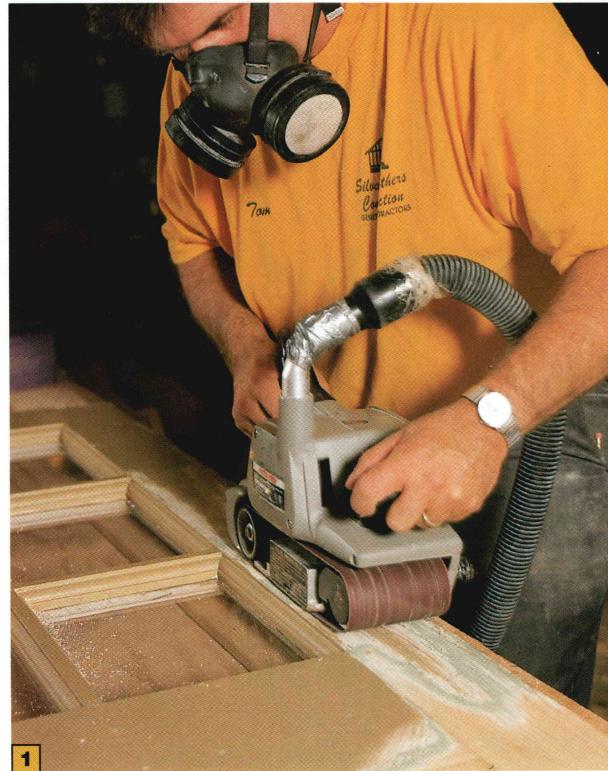
PHOTOGRAPHS BY KELLER & KELLER

1. Stripping paint brings out the best in a belt sander and the worst in belts. Tom Silva keeps his sander moving constantly so as not to overheat the surface and clog the belt. Old paint may harbor lead, so Tom dons a respirator and hooks his 4-by-24 to a shop vac. When he gets down to bare wood, he switches from 36 grit to 120 grit and sands only with the grain. A random-orbit sander with a 220-grit disc finishes the job.

2. Tom smooths stacks of cedar shelving by pushing back and forth in overlapping passes at an angle to the wood grain. Slight variations in the edge-glued boards can tip a sander and gouge, so Tom skews the tool for greater stability. He'll take out the resulting cross-grain scratches by sanding with the grain.

3. Smoothing ragged end-grain edges requires an 80-grit belt, solid footing and a good view of the action. To keep the tool from tipping, Tom sands near the belt's centerline, and he watches for a slight shadow between belt and wood, a telltale clue the sander isn't being held flat.

4. Rounding the ends of table legs calls for light passes and constant motion; otherwise the sander leaves flat spots. Securing the work is a must. A sander can fire loose pieces of wood like a missile launcher.



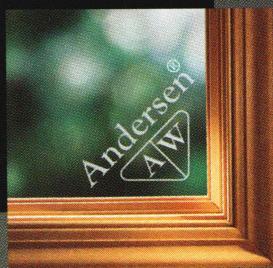


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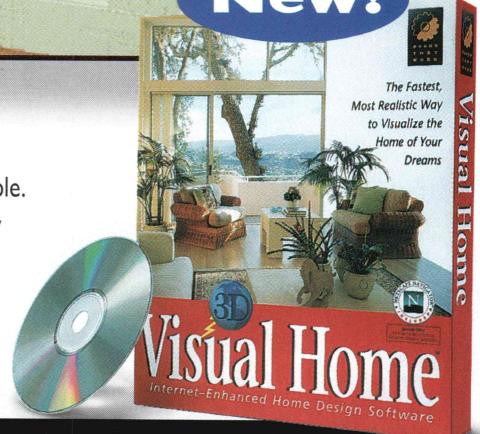


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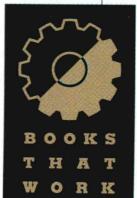
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Wonder Rock

Drywall, the plaster substitute everyone loves to hate

BY DON BEST **PHOTOGRAPH BY JAMES WORRELL**

Our eyes, drawn to the fine woodwork, fancy tile and other delights of domestic architecture, overlook 80 percent of almost every room. Hidden in plain sight on virtually every wall and ceiling is a sandwich of paper and gypsum that is smooth, fire resistant and unloved.

Call it Sheetrock or wallboard, plasterboard or drywall, it's the modern-day replacement for plaster. And though drywall falls short of plaster's hardness and durability, it's cheap to buy and simple to install. A room can be painted as soon as it's "rocked," but a three-coat, trowel-applied plaster job must first cure for 30 days. Thus drywall is king of wall and ceiling, wearing its crown by financial default.

At the heart of every drywall panel is gypsum, a whitish, chalky mineral. Legend has it that Ben Franklin introduced gypsum plaster to the United States when he returned from France in 1785. Unlike the mud- and lime-based products that preceded it, plaster of Paris bonds tenaciously, molds easily, sets fast and turns rock hard. What's more,



it's nontoxic, safe to work with and extremely abundant. By the latter half of the 19th century, it had become the plaster of choice in the United States.

In 1894, seeking to reduce the time and effort that quality plasterwork required, inventor Augustine Sackett discovered that plaster could be cast in a rectangular mold and reinforced with layers of felt paper to create a rigid board. He patented the process, improved it and introduced "Sackett Board" in 1898.

The product caught on as an underlayment for coats of finish plaster. By the 1920s, drywall began to surface

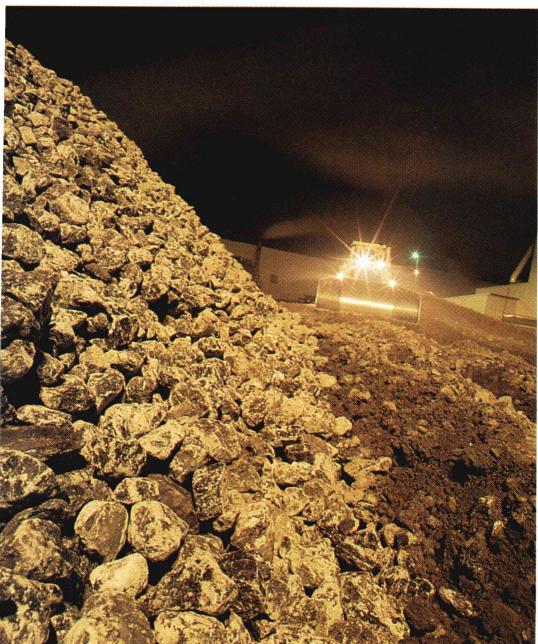
as a finished wall covering in its own right. The need during World War II for military construction accelerated drywall's acceptance and helped the industry gear up for the postwar housing boom.

Today, drywall's dominance is secure. The United States produces

it in titanic volumes: 24 billion square feet each year (see Believe It or Not, p. 42). To meet the demand, millions of tons of gypsum rock are

extracted annually from quarries and mines in the Midwest, Canada and Mexico. Since the 1970s, drywall manufacturers have also been "mining" coal- and oil-fired power plants, where gypsum is a waste product of air-pollution control.

To turn raw gypsum into wallboard, the rock is crushed, then "calcined"—cooked at 350 degrees until it turns into a dry powder called plaster of Paris or stucco. This plaster is mixed with water and additives to form a slurry that flows onto a continuous sheet of moving paper made from recycled newsprint. A second piece of paper rolls out on top. The resulting sandwich is fed through rollers that press it to uniform thicknesses from a quarter-inch to a full inch in eighth-inch increments. Quarter-inch board is flexible enough to hug



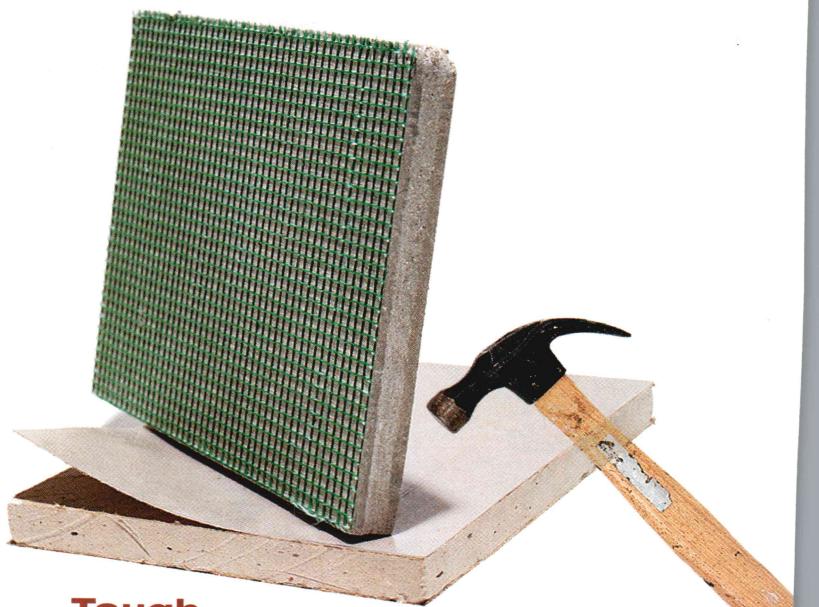
Raw gypsum rock fresh from a Nova Scotia quarry awaits the crusher, the next step on its way to becoming drywall.

Burn It, Splash It, Bash It



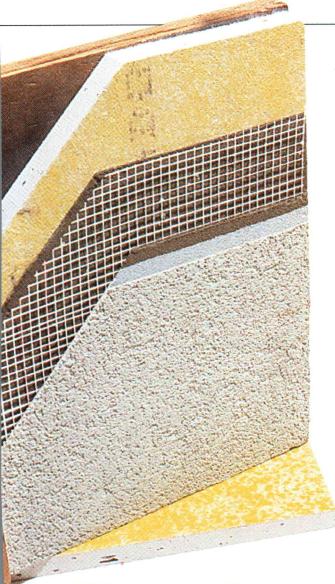
Smooth

Blueboard has a special paper, tinted for easy identification, that bonds tightly to veneer plaster.



Tough

These boards withstand abuse that would cause regular drywall to crumble. The top panel has a thick layer of pressed paper fiber covering a gypsum core filled with more paper fiber and perlite. Green fiberglass mesh on the back provides additional reinforcement. The bottom board, faced with a 20-mil-thick sheet of Lexan, is 17 times stronger than conventional drywall.



Glassed

Drywall for outdoor use requires advanced technology to protect the core from the elements. This substrate for synthetic stucco has a silicone-treated core and faces of yellow alkali-resistant fiberglass. Comes with a 5-year warranty.

Foiled

In regions with cold, wet winters, aluminum-backed drywall stops moisture trying to seep through walls and into wall cavities. The foil side always faces the inside of the cavity.



Green

Water wrecks wallboard. So for walls and ceilings in bathrooms, builders put up this moisture-resistant drywall with green-tinted paper. The gypsum contains water-repellent wax emulsion; the paper is also specially treated. Though designed as an underlayment for wall tile, greenboard shouldn't be used in showers or anyplace that receives more than the occasional splash.



Cool

Regular drywall stands up well to fire but loses strength as heat drives out the water in the plaster. (Gypsum is 20 percent water.) This $\frac{3}{4}$ -inch-thick board—rated to withstand a 1,700-degree fire for two hours—contains additives such as glass fibers and vermiculite that hold the panel together as the gypsum turns to dust.



Embossed

For the look of an elegant raised wood panel without all the demanding joinery, these gypsum-cored boards have raised panels pressed into them.



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curved walls and ceilings, but most walls are clad in half-inch sheets. Thicker dimensions are needed where additional strength or fire resistance is important.

One of drywall's greatest virtues is how easily it can be customized. It comes in lengths up to 16 feet, and because of the growing popularity of high ceilings, manufacturers now offer 54-inch widths. Placed horizontally, two sheets can cover a nine-foot wall.

Likewise, gypsum's natural resistance to fire can be increased by embedding glass fibers or vermiculite in the core. Attempts are being made to combat plaster's biggest enemy—water—with silicone additives, wax

emulsions and fiberglass or plastic skins. Can these products, marketed as underlays for shower stalls, exterior walls, and even roofs, hold up? Yes, if the cores don't get wet.

Drywall's other weakness shows on impact. Furniture, fists, even

doorknobs that bounce off a plaster wall can poke though half-inch drywall with relative ease. Part of the reason is that the gypsum core is aerated for lightness (a sheet of half-inch drywall weighs 48 pounds, down from 80 in 1900), so screws and nails can penetrate easily. For impact-resistant drywall, companies mix paper fibers in the core, overlay fiberglass mesh or apply thin sheets of Lexan, a clear, practically unbreakable plastic.

An air-filled gumbo of wet gypsum plaster spills out onto a moving sheet of paper at a factory. A modern drywall plant can produce about 1,600 square feet of drywall every minute.

Despite all these improvements, drywall remains a remarkably inexpensive commodity—so inexpensive, it's easy to overlook its aesthetic and functional advantages. Even in its glory days, plaster was rarely as smooth as modern drywall or as easy to repair. And putting up drywall is a far more efficient process.

Too bad it can't get any respect.



Put This in Your Pea Patch



What happens to all the leftover drywall scrap from *This Old House* projects? Some of it ends up in landfills, of course. But in New England, a lot of that scrap drywall is trucked back to the Dana Wallboard Supply Co. in Tyngsborough, Massachusetts, for recycling. Since 1988, Dana Wallboard has provided the drywall for every *This Old House* project in New England, including the Victorian currently being renovated on Nantucket.

The company's pioneering work in recycling began in

1992, when owner Greg Dana reached an agreement with a huge drywall plant in nearby Newington, New Hampshire. Like many such plants around the nation, the Newington facility was already recycling its own manufacturing waste. Its only condition was that Dana's scrap be free of screws, nails, asbestos and lead paint.

"The response has been great," Dana says. Every two weeks, the 30-yard dumpster in his company lot gets filled with chunks of broken drywall—about 50 tons' worth—brought by customers who pay a modest disposal fee.

Al Parker, environmental manager for Georgia-Pacific's gypsum division, believes more drywall would be recycled if the scrap could be collected and transported cheaply.

Instead of throwing it in landfills, some people are working drywall directly into the land. Farmers in California and parts of Colorado use recycled gypsum as a soil conditioner for grapes, peas and peanuts. Researchers working with corn in New York and turf in Maryland suggest that other crops could also benefit from a little drywall dust in the ground.

Believe It or Not:

- In 1994, a prodigious 24 billion (yes, *billion*) square feet of drywall rolled out of U.S. factories. That's the equivalent of 725 million sheets of $\frac{1}{2}$ -inch 4x8 drywall, **enough to clad the interiors of nearly 5 million average-size homes**. Or...
- If all this production were donated to the artist Christo, the Reichstag wrapper, he could butt the pieces end-to-end and make a four-foot-high wall 1.1 million miles long, which would **girdle the globe 44 times**. Or, providing the local residents didn't object, he could **cover all of Orange County and San Francisco** with a drywall blanket 861 miles square.
- Stacking the panels face-to-face instead of end-to-end would create a **compact wall 4 feet high by 8 feet thick and 5,721 miles long**, just 65 miles short of the Trans-Siberian Railway's route from Moscow to Vladivostok.
- Looked at another way, the 942.5 million cubic feet of plaster and paper produced every year could **build 34 full-size replicas of the Great Pyramid in Egypt**.
- Only a public-works project as immense as the Great Wall of China would exceed the United States' annual drywall production. Duplicating the longest continuous portion of the wall—a section 12 feet wide by 25 feet high and 2,150 miles long—would eat up **about three and a half years' worth of wallboard**.

**THE THINGS YOU BUILD WILL BE
STANDING LONG AFTER YOU DIE.
LEAVE A GOOD MARK.**



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Artists sign the bottom of the canvas. Athletes set records. Yours is a more subtle signature.
But if you do it right, your legacy won't fade. And it will never be broken.





Slick as ice, this saw's unique lever system, hidden in the handle, locks in proper blade tension with a single squeeze. Spare blades are stowed in the frame's hollow rectangular bar.

Hack Away

A saw that cuts through anything you can imagine

BY WILLIAM SAMPSON PHOTOGRAPHS BY MARTIN MISTRETTA

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acksaws are tools of last resort. No matter how hard the material or how desperate the situation, hacksaws refuse no challenges. With the right blade, enough muscle and plenty of time, a hacksaw can slice through virtually anything—steel, brass, glass, tile, concrete, ice, bone, even solid stone. Their little piranha-sharp teeth never give up. Plumbers prize hacksaws for slicing through every type of pipe. Butchers use them to make short work of carcasses and frozen meat, and auto



A top-mounted tensioning system combines a thumbwheel, threaded rod and an articulated lever arm to make adjustments easy. Change blades carefully: When tension is released, the pins holding the blade often fall out.



Mini or frameless hacksaws work well in tight quarters. Mount blades to cut on the pull stroke to compensate for their lack of stiffness. These frames extend the life of other hacksaws' retired blades, which are seldom worn down on the ends.



Not just a toy for craft projects, a 6-inch pony saw can hack the fine work when a full-size model would be too much tool. This model uses scrollsaw blades with pins.

mechanics rely on them to sever rusted bolts. Carpenters sneak hacksaw blades between sash and sills to free windows, and roofers trim gutters with them. Nothing beats a good hacksaw blade for making a smooth cut through hardwood.

Blacksmiths came up with the idea for the hacksaw in the early 1800s by forging blades from broken scythes or wagon springs. Factory-made saws with wing nuts and stamped-metal frames were first produced after the Civil War and remained little changed for more than a century. Now frames feature rigid tubular steel with cast-aluminum components, front-end grips, internal storage for spare blades, closed D-handles and 45-degree blade mounts to make angled or flush cuts easier. Some frames adjust to accommodate 10- or 12-inch blades.

But the best feature of the newest saws is their lever-action tensioners, which can easily put 30,000 pounds of tension on a blade—the optimal amount for fast, straight cuts, says Paul Gelineau of American Saw and Manufacturing Co. Older stamped-metal frames could theoretically produce 15,000



This saw combines modern features like a chromed-steel tube frame and a textured cast-aluminum handle with yesterday's blade-tensioning: the old-fashioned wing nut.

pounds of blade tension, but only if your fingers were also made of steel and molded to fit the profile of wing nuts.

Despite improvements in frame design, the heart of a hacksaw is its blade. The best are bimetal: a spine of flexible spring steel welded to a toothed strip of hard but brittle high-speed tool steel. Bimetals are tough enough to survive modern high-tension frames. Cheap carbon-steel blades will shatter easily and dull quickly too. Hackers often get into trouble when they put an all-purpose 18-teeth-per-inch blade in a frame and expect it to do everything. That blade works fine on nonferrous metals, metal rods and iron pipe, but on thin-walled tubing such as that used for electrical conduit, the teeth will catch, bind and even break.

Of course, in emergencies, any old hacksaw will do. One *This Old House* magazine staffer grabbed his at a recent Christmas celebration when his *croquembouche*—caramel-covered cream puffs—welded together in the oven. “It was not my finest moment *au table*,” the amateur chef recalls, “but it was a case of ‘no hacksaw, no dessert.’”

No. 11



On a camping trip at Trillium Lake, our Siberian Husky, Teddy, had a run-in with a rather rascally adversary, TAR. Some how tar from the parking area had caked the hair between his paw pads, cementing them together. He couldn't walk.

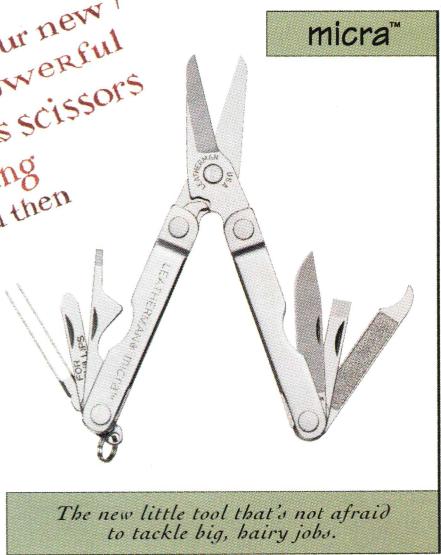
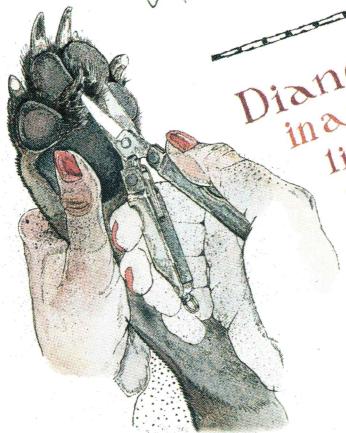
He howled in pain, & sat by the fire, perplexed. Then I remembered the handy little scissars and Micra I had just started carrying. I folded out the

Diane Eiden,
Richfield, Minnesota

perplexed. Then I remembered the handy little scissars and Micra I had just started carrying. And Teddy took off to play his favorite game, chipmunk chasing.

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Tiny teeth, big bite

PHOTOGRAPHS BY DARRIN HADD



Match the blade to the task, and good results are a cinch. As a rough guide, use coarse blades on thicker or softer materials, fine blades on harder or thinner ones. The coarsest blades, with 14 teeth per inch (not shown), are suitable for aluminum, plastic pipe and wood.

1. Choose an 18-tpi blade to cut copper, brass and other nonferrous metals, as well as metal rods and cast-iron pipe.
2. A 24-tpi blade is best for steel conduit and sheet metal no thicker than $\frac{1}{8}$ -inch.
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- 4, 5. Rod and grit saws are the pit bulls of blades. Instead of teeth, they have superhard tungsten-carbide granules that slowly cut through almost anything—brick, stone, concrete or glass block. For straight cuts, use grit saws; rod saws excel at curves.

Push hacksaw blades too hard, and they'll just call it quits. LEFT: Tightening a hot blade can make it snap in two as it cools. MIDDLE: Overheating a blade can give it a permanent bow. RIGHT: Forcing coarse blades through hard, thin metal may break teeth. Instead of muscling through a cut, ease off and let the tool do the work.

blade-running tips

MAKING THE CUT: Start by scoring the surface with a file or gently dragging the saw backward a couple of times. Once the kerf is deep enough, apply pressure only on the push stroke to avoid dulling or binding the blade.

POSITIONING THE BLADE: The teeth should point forward so the saw cuts on the push stroke. Many blades have arrows to show the proper position.

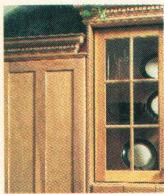
CUTTING THIN STOCK AND TUBING: Use fine-tooth blades and try to angle the saw so at least three teeth are cutting at once. On high-tech alloys, "walk" the blade around instead of pushing straight through. Otherwise, teeth are likely to catch, bind or break.

SAWING SLOTS: Turn a hacksaw into a fast-cutting file by stacking two or three blades in the frame at once.

How to Ruin a Blade



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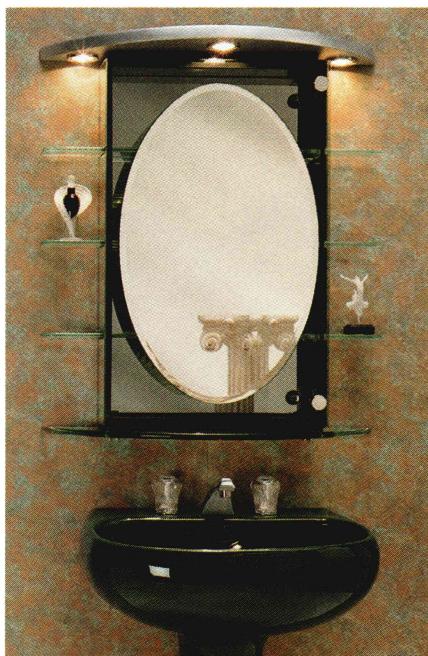
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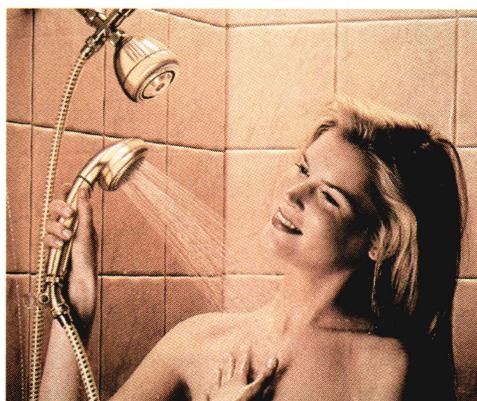
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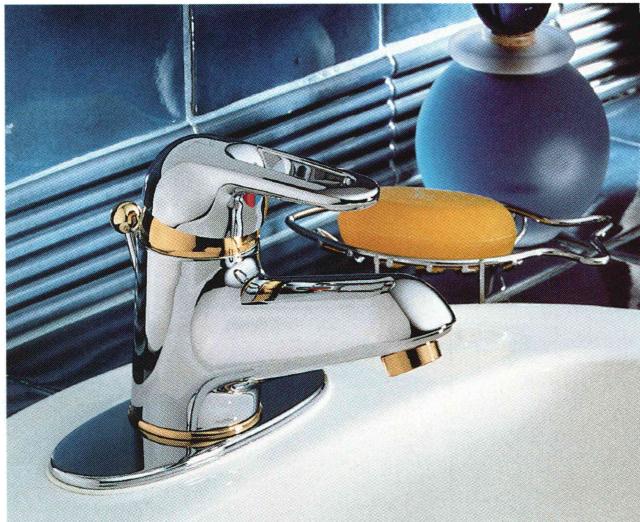
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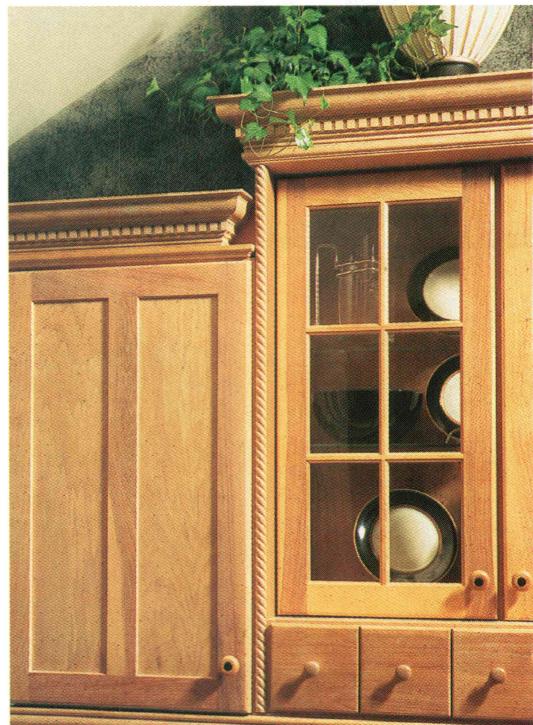
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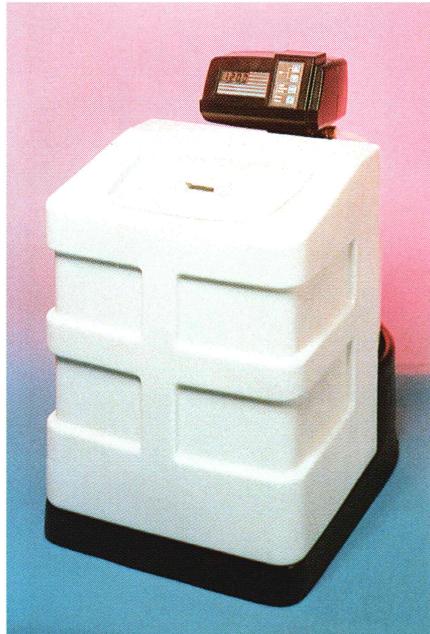


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Take 'Em With You

There's nothing handier than a well-worn tool belt

BY WENDY TALARICO **PHOTOGRAPHS BY DANIEL MOSS**

a

carpenter reveals a lot about himself by the way he carries his tools. That's an important lesson Ted Fales, a member of the construction crew for the fall TV project in Nantucket, has learned during 16 years framing houses. "When a guy comes to a site asking for work, claiming years of experience, the first thing you look at is his tool belt," says Fales. A greenhorn carpenter, he observes, will typically sport a belt bristling with too many tools and buckle it tightly around

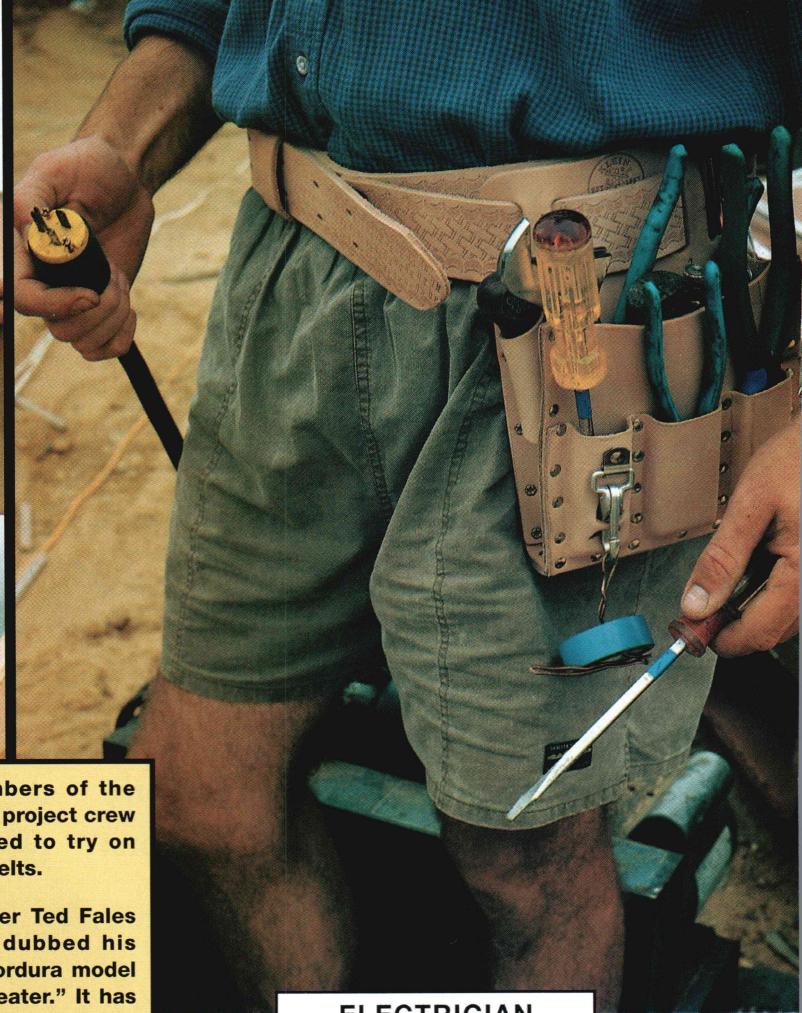
A tool belt is more than just an extra set of carpenter's pockets—it's the rugged symbol of a hands-on trade. In Norm Abram's view, "It's as much of a tool as a hammer or a circular saw."



Try One On



FRAMER



ELECTRICIAN

his waist. By contrast, Fales keeps his own soft leather tool belt lightly loaded, loose and slung low on his hips.

When Fales is at work, his hands dip with lightning quickness in and out of the pockets. He knows the contours of the belt so well he can find anything he needs—a utility knife, a speed square, a hammer, a handful of nails—without so much as a downward glance.

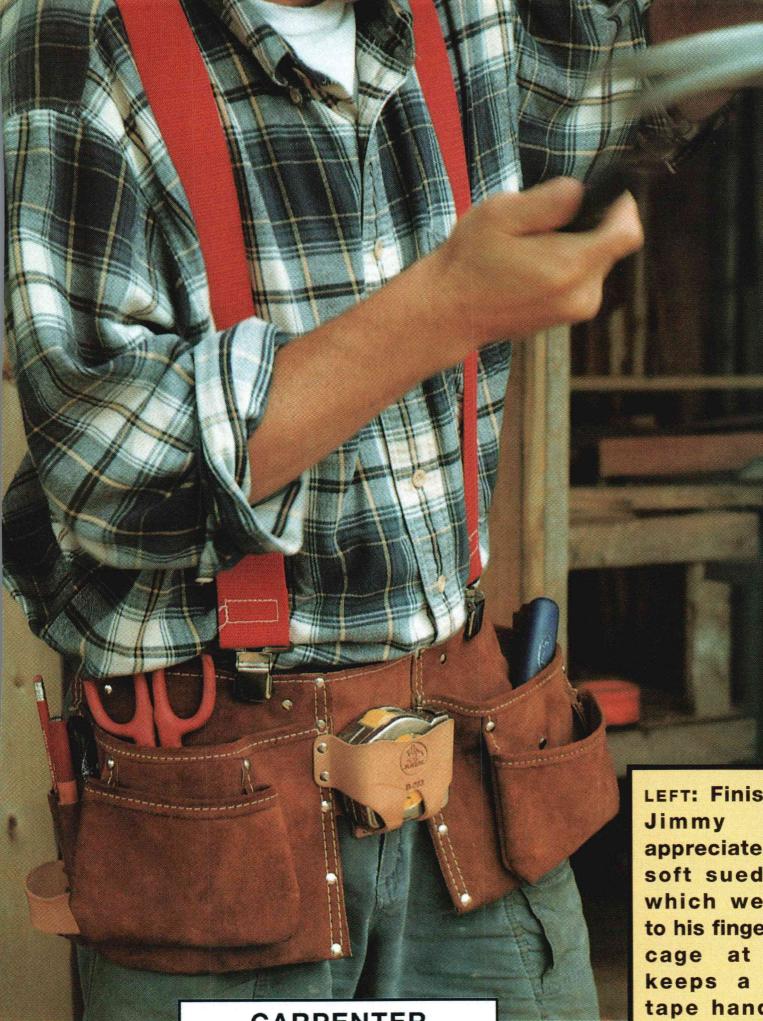
Durability is the first thing to look for when shopping for a tool belt. Tightly stitched seams and rust-resistant rivets at stress points are a must, and the pouches should be made from strong material. Canvas or cotton may be good enough for clerks at the lumberyard, but carpenters in the field need something tougher to resist the wear and tear from carrying chisels, knife blades, nails and other sharp objects.

Leather is the traditional material of choice. Tool belts made of top-grain cowhide—smooth on the outside and rough on the inside—take a lot of punishment; they also take a long time to break in. Like many carpenters, Fales would need a lot of con-

vincing before he considered a belt made of anything but thick cowhide. On the other hand, Jimmy Coppinger, the lead carpenter for this fall's television project on Nantucket, uses a suede tool belt. Suede is softer, more supple and easier to break in. The downside is that it's thinner and likely to wear out sooner.

Nylon is a less expensive alternative to leather. Cordura, an abrasion-resistant nylon fabric, is light and won't mildew or crack if it gets wet. Jose Munoz, product services manager for tool belt maker McGuire-Nicholas, says a Cordura belt should last twice as long as a good leather one. "The biggest drawback is that nylon won't conform to the body," he says. "It's like wearing plastic shoes instead of leather ones."

There are even more options when it comes to choosing the belt's harness: narrow or wide, metal buckles or plastic clips, front or back release. Adjustability is the key, especially if the belt will be worn over light clothes in the summer and bulky wraps in the winter. *This Old House* contractor Tom Silva grew tired of belts that can only be tightened or loosened in discrete



CARPENTER

increments, so he came up with a novel solution. He snipped off the buckle on his tool belt and replaced it with one from a car seat belt.

The size and number of pockets on a tool belt is largely a matter of taste. Some carpenters prefer pouches that slide along the belt. Others feel more comfortable with pouches that are sewn in place so they won't slip and slide. In either case, the pockets should have openings large enough to reach into and smooth seams along the edges instead of the bottom, where they can trap nails or other odds and ends.

Old habits and eccentricities inevitably determine how an individual uses his tool belt. *This Old House* master carpenter Norm Abram is right-handed but usually hangs his 16-ounce hammer from a metal loop on his left side. He picked up the habit years ago when the right-hand loop broke on one of his old tool belts. Now, even though he has to reach across his body every time he grabs for his hammer, it often ends up in the left-hand loop. "It's a little crazy," he says, "especially since I have a loop on the right side that sits empty."

LEFT: Finish carpenter Jimmy Coppinger appreciated this belt's soft suede pockets, which were friendly to his fingers. A leather cage at the front keeps a measuring tape handy, and the pockets are deep enough to accommodate his nailsets, a putty knife, glue, snips, a block plane, screws, sandpaper and lots of pencils. "I wind up collecting pencils from all over the job site," he says.

RIGHT: For roofing work, Danny Dwyer initially liked the idea of wearing a tool belt with a single pouch that wouldn't get in his way. But he soon discovered there wasn't enough space for all his nails. Luckily, the tool belt can be customized by adding more pouches. One unique accessory: a metal hammer loop with a safety strap.



ROOFER

Fales shuns hammer loops entirely and stuffs his 24-ounce framing hammer in a deep right-side pocket. Working a hammer free from a loop, he says, takes too much time.

A good tool belt will last at least three or four years, perhaps longer if it is restitched. For some carpenters, the real problem is what to do with an old belt once it wears out. Fales still keeps his first belt in the shop, despite the holes in the pouches and the ragged bits of thread that hang from the seams. "I can't throw it away," he says. "There are lots of memories in that belt."

Besides, breaking in a new one can be a somewhat traumatic experience. With many tool belts, it takes at least two weeks for stiff pockets to stretch and for the leather or nylon to lose its

store-bought sheen. Indeed, brand-new tool belts attract so much attention that self-respecting carpenters have been known to scuff them in the dirt and wear them around the house for a few days before braving a job site.

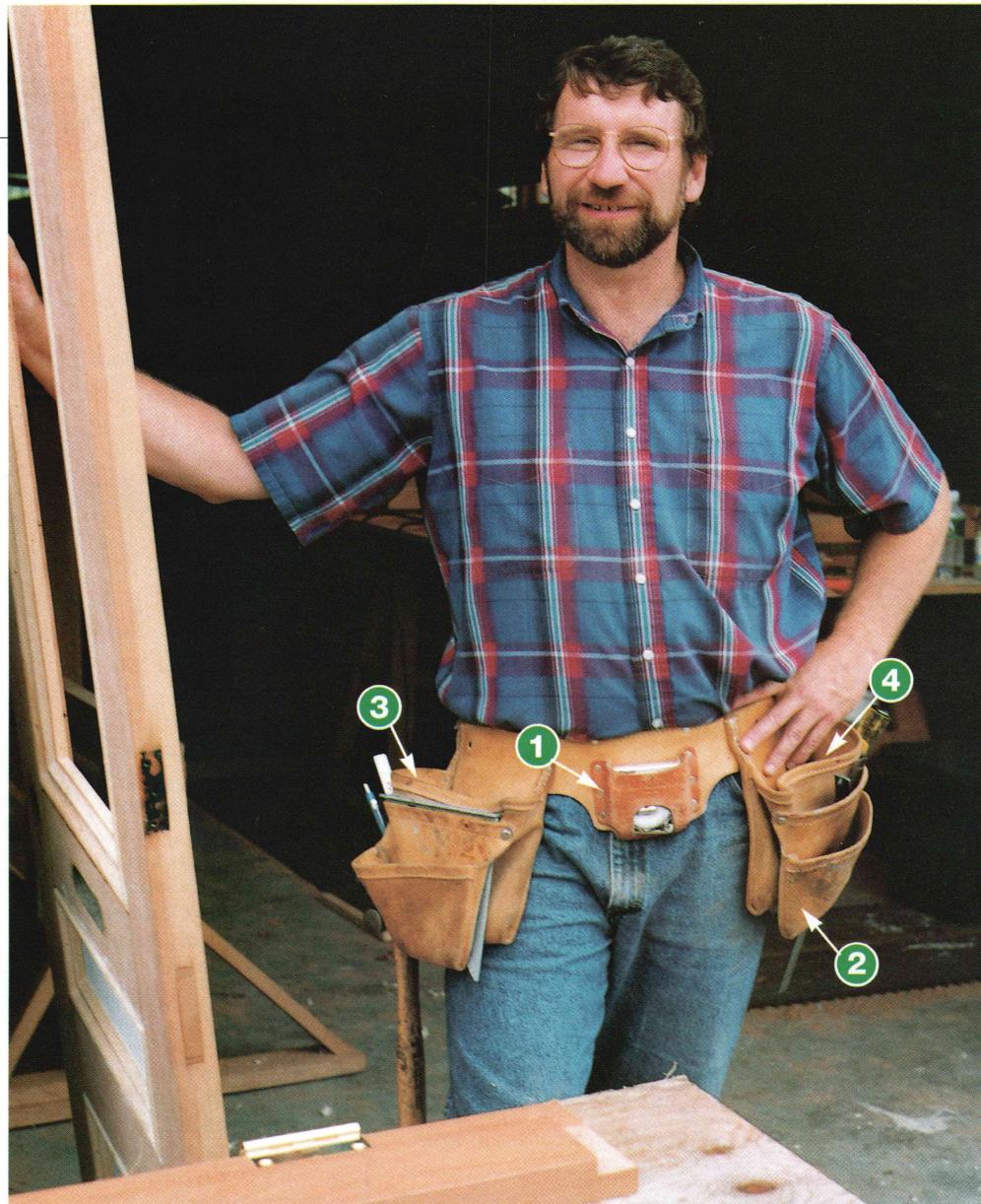
"The guys will make fun of you when you show up with a new belt," says Jimmy Coppinger, "That's guaranteed."

Norm's Sidekick

Norm Abram is so attached to his cowhide belt that he wears it around the shop instead of grabbing tools off the shelf. "It's so easy to have all you need right at your waist," he says. This belt, which has been his faithful hipside companion for years, has a cotton-web harness with a plastic buckle in back and is very easy to put on and take off. The honey-colored pouches, with darkened edges polished by age, have developed the satisfying sags and bulges that make a belt comfortable and give it character. "I like the way the leather feels," Norm says. "Smooth and substantial."

INSIDE A MASTER CARPENTER'S BELT

Norm's tape measure (1) has a home in the front of the belt. He reserves the shallow outer pockets (2) for nails, screws and sandpaper and tucks bigger items in the deep inside pockets. He fills the inside right pouch (3) with countersinks, driver bits, a compass, a wood rasp and even a pair of tweezers. When the job requires more tools, he stashess them in the left inside pouch (4).



A Personal Portable Tool Box



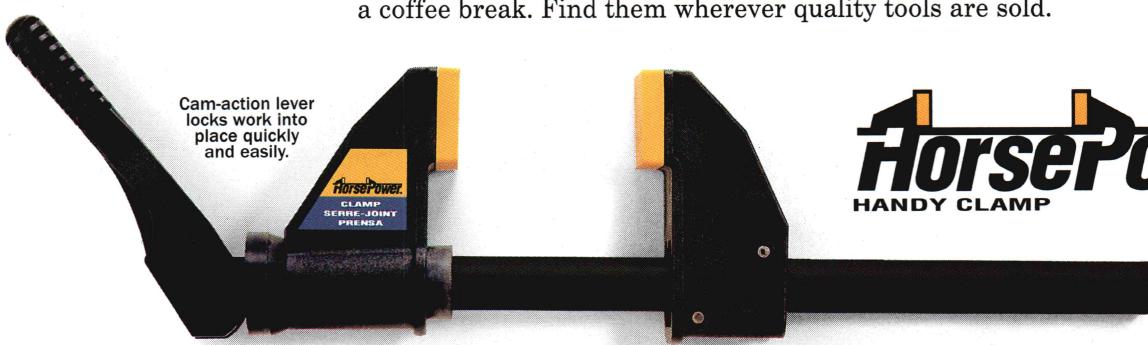
There is no perfect tool belt. Subtle differences—in the width of the harness, the way the belt buckles and the size and number of pockets—may meet the needs of one workman but not another. Some manufacturers offer special slide-on pouches and tool-holding accessories that can be matched to a particular type of task. If a pouch wears out, it can be tossed without sacrificing the whole belt.

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Trip the Lights Fantastic

Electrifying the outdoors with holiday cheer

BY JESSIE R. MANGALIMAN PHOTOGRAPH BY KELLER & KELLER

S

ome folks revel in an exuberant display of holiday lights that brighten an entire neighborhood. Others delight in stringing up a few dozen bulbs to accent a tree or a porch. High wattage or low, outdoor lights are the stuff of memories. At one extreme is Harris Taormina, who for each of the past 35 winters has lighted up the Ozone Park section of Queens, New York, with the 10,000 lights that cover his house and yard.

Homeowners Mark Christofi and Mark Selfridge of North Reading, Massachusetts, prefer a slightly more modest display. *This Old House's* electrical contractor, Paul J. Kennedy recently wired the porch of their two-story, 1830s Greek Revival home so they could safely garland five Frasier firs in the yard, four Douglas firs by the driveway, and a few traditional cut Christmas trees.

However, beautiful, ambitious holiday lighting schemes can be a dangerous mix with winter moisture. Anyone who wants a house to glow in the dark not only needs the right kinds of lights, but also weather-proof outlets, ultra-sensitive

circuit breakers and an awareness of watts, volts and amps.

Kennedy often sees first-hand what happens when the rules of outdoor lighting are ignored. He's been called all around Boston to

Safety should be the first priority of anyone who joins a grand tradition by stringing outdoor holiday lights.



homes where overloaded circuits have burned or shorted. One of Kennedy's friends once connected all his lights, plug into plug, and was baffled when the bulbs promptly burned out. "He kept running back to the store saying his lights were no good," Kennedy says.

The first step to avoiding trouble is to buy the right lights. Kennedy recommends only UL-listed lights because they have been factory tested for safety and meet accepted electrical standards for indoor/outdoor use.

Light sets should be wired in parallel or use shunt bypasses. Otherwise, a single blown bulb will shut the whole string off. Trying to find the fizzled filament on a long string of lights is nobody's idea of holiday fun, especially on a cold December night.

Miniatures are the most popular and least expensive outdoor decorative lights. They come in various lengths: 35-light sets strung on about 17½ feet of wire, 50-light sets on 23 feet of wire



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and 100-light sets on 42 feet of wire. Miniature sets sip electricity; each bulb burns about half a watt. But finding individual bulbs can be a nightmare. "Buy an extra set and use the bulbs as replacements," recommends Judi Brooks Kraft, manager of Just Bulbs in New York City.

For an ambitious display, there are old-fashioned bulbs known as C-7s and C-9s. These are the lights used on the National Christmas tree in Washington, D.C., and Rockefeller Center's tree in New York City.

They're more durable than miniatures and, because they have screw-in bases, are easily replaced. Both come in 15- or 25-foot sets of 25 lights. Taormina prefers the sets made by General Electric because the wires have good insulation and the bulbs resist fading or flaking. Bulbs on these sets are spaced a

The National Christmas Tree at the White House will be lighted for the 84th time this year.

The 40-foot Colorado blue spruce will be garlanded with strings of 10,000 lights on 1,600 feet of wire—the length of more than five football fields.

to six sets long.)

With C-7s and C-9s, no more than two sets should be connected at a time. Above all, C-7s and C-9s should not be put on the same string with minia-

ture lights. Their mismatched wattages could burn out bulbs or short a circuit, taking the spirit of Christmas with them in a cloud of smoke.

Unless the aim is to top Taormina, who has eight outdoor outlets and has rewired his house for 200 amps, one 15- or 20-

amp outlet should be sufficient to bring a little holiday radiance outdoors. But before plugging in any lights, some math is necessary.

First, determine how many watts are available to power the lights.

Wattage is household voltage multiplied by circuit amperage. For example, the 120-volt, 20-amp circuit Kennedy installed in North Reading can supply up to 2,400—or $120 \times 20 =$ 2,400 watts of power.

The next challenge is to figure out the wattage of a

light set by multiplying the number of watts of each bulb by the total number of bulbs on the set. Thus, a 25-bulb set of

five-watt C-7s consumes 125 watts.

Then divide circuit wattage by light-set wattage for the number of sets that can safely be connected to the outlet. Thus, a 2,400 watt circuit could handle 19.2—or 2,400 divided by 125—strings of C-7s.

Family members,

In 1903, the Ever-Ready Company of New York manufactured the first festoon—a string of 28 miniature lightbulb sockets—and launched the tradition of electric lighting at Christmas.

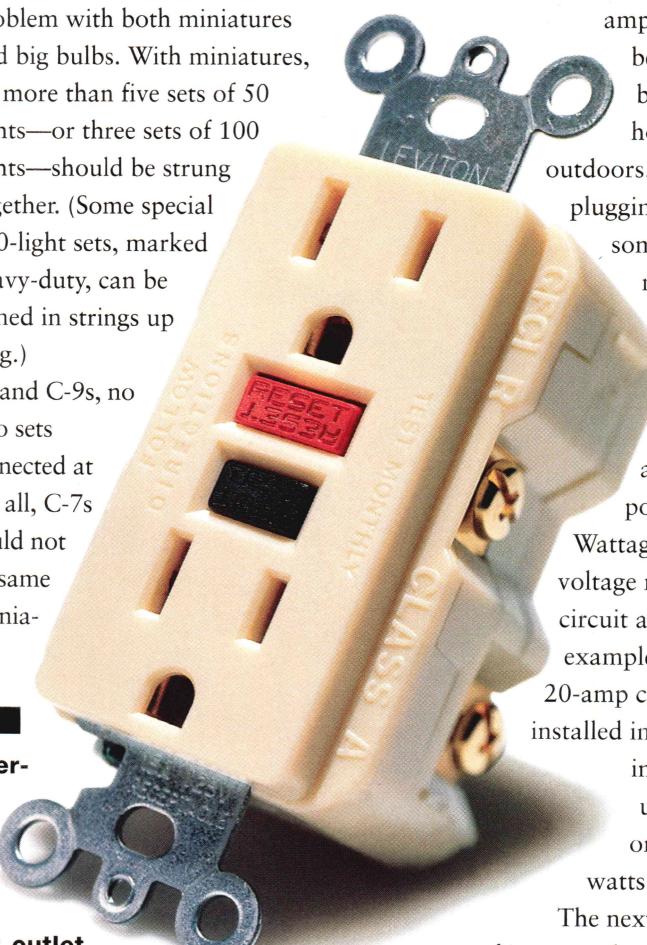
Electrical overload can be a problem with both miniatures and big bulbs. With miniatures, no more than five sets of 50 lights—or three sets of 100 lights—should be strung together. (Some special 100-light sets, marked heavy-duty, can be joined in strings up

to six sets long.)

With C-7s and C-9s, no more than two sets should be connected at a time. Above all, C-7s and C-9s should not be put on the same string with minia-



electrical contractor Paul Kennedy suggests this may not be the best way to go. Even after GFCI outlets are fitted with specially-sized weatherproof covers, "moisture gets in them and there are a lot of false trips," he says. Kennedy prefers to go straight to the breaker panel inside a home, left, and install a GFCI breaker onto the bus bar. "It's about three times as expensive, but inside the house it's less likely to corrode," he says. One cautionary note: Don't try to install a GFCI breaker yourself. With so much raw, potentially lethal power flowing through a home breaker panel, this is a job that should be done only by a licensed electrician. "Don't go in there," Kennedy warns. "Stay safe, stay alive, stay out!"



Preventing the shock of your life

Every outdoor outlet needs a ground fault circuit interrupter (GFCI), a device that cuts off electricity before it can harm anyone in its path. Indeed a GFCI is now required for exterior outlets by the new National Electrical Code. GFCI outlets like the one pictured at right can be retrofitted to exterior outlet boxes by almost any homeowner. Nevertheless, This Old House

Beauty on a String

A fused plug ensures bulbs will retain their pearly glow.



Snow-cone lights are durable C-7 bulbs with screw-in bases.



Visible filaments add variety to lighting displays.



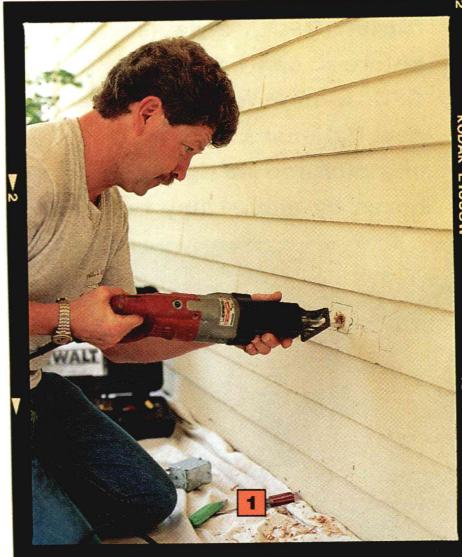
neighbors and the mailman, not to mention pets, could be in for nasty shocks if a light display is set up without a ground fault circuit interrupter (GFCI). This special breaker shuts down the instant any electricity escapes the circuit. On the Christofi and Selfridge project, Kennedy installed a GFCI on the breaker panel in the basement and connected it to a standard three-prong outlet (see sidebar at right). He then set up a 50-foot, 14-gauge extension cord, also for outdoor use, to convey power to the outlying light sets. As a final step, he wrapped all the connections with black electrical tape to keep out moisture and prevent them from becoming unplugged.

Following a practice advocated by Kathy Presciano, a GE lighting special-

ist who is designing this year's National Christmas Tree, Christofi and Selfridge decided to add texture and visual impact to their display by using different types of lights in different trees. Strings of blue, orange, green, white and red C-9s glow brilliantly against the dark evergreen branches of their firs, while the cut trees on the porch glitter with tiny miniatures.

The display evokes a feeling of Christmases past for Christofi and Selfridge. Their house is perched on a hill where a Colonial-era tavern once stood, beckoning travelers with the light from its windows. This holiday season, a bright glow from the hilltop will again draw the gaze of passersby. "These lights," says Selfridge, "make everything warm and inviting."

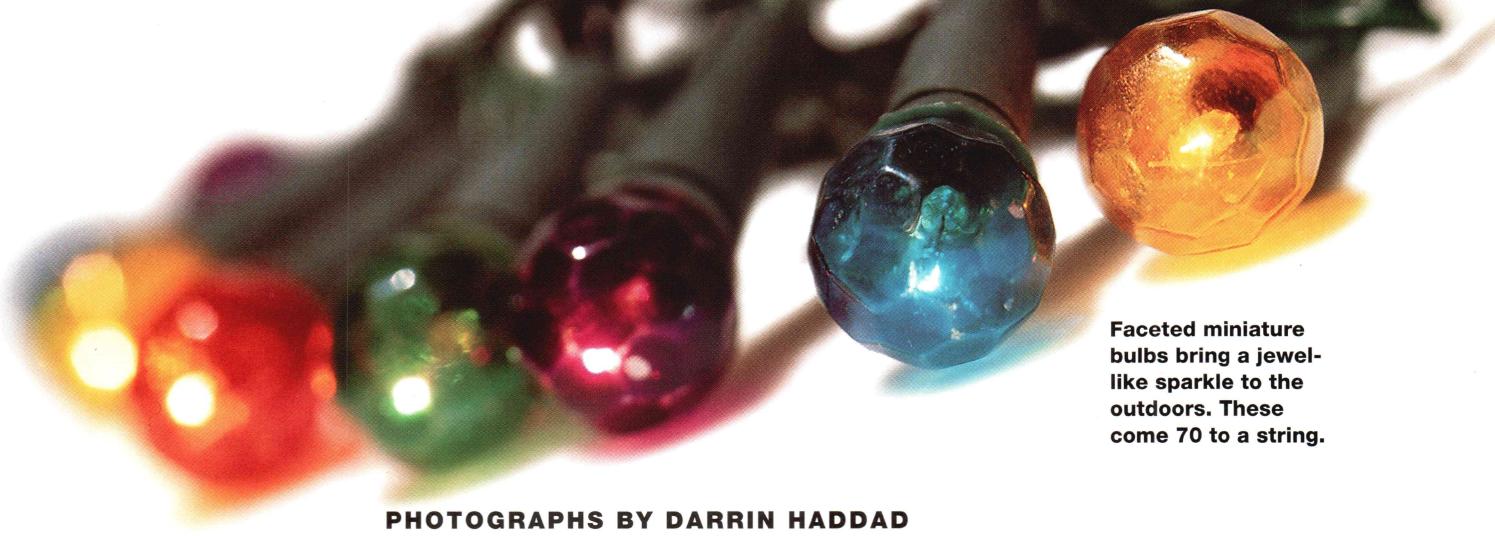
Driving by General Electric's half-million-light display in front of the Nela Industrial Park has been a ritual in Cleveland, Ohio for 72 years.



Let there be light: Pulling power for a merry twinkle

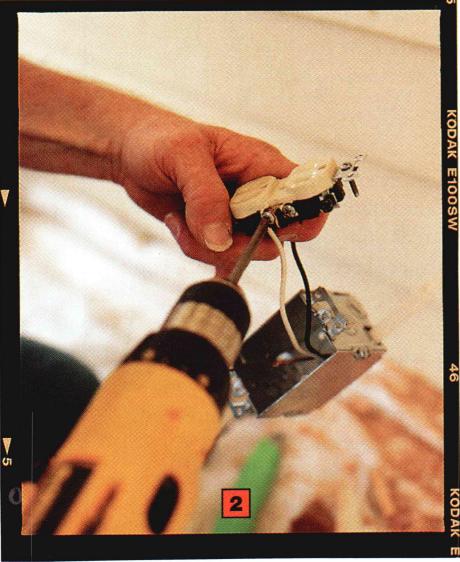


Heavy-duty C-9
bulbs are the
best and
brightest choice
to re-create a
retro-'50s look.

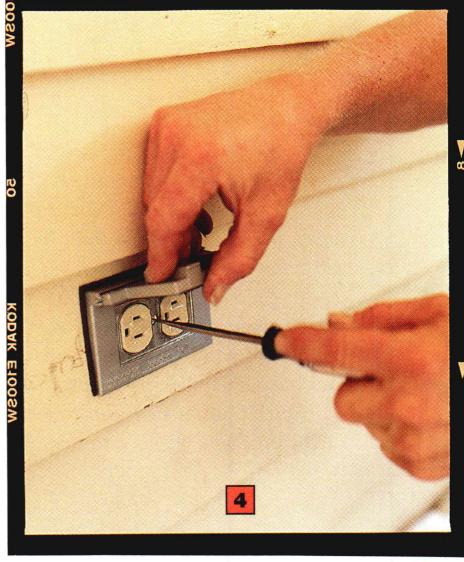
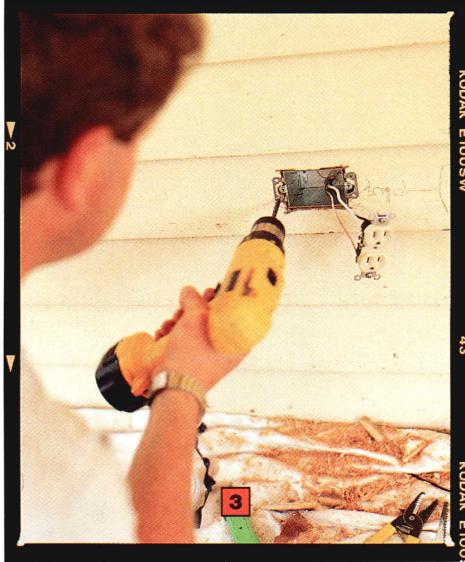


Faceted miniature
bulbs bring a jewel-
like sparkle to the
outdoors. These
come 70 to a string.

PHOTOGRAPHS BY DARRIN HADDAD



KODAK E100SW 46 KODAK E



integral clamp. **2.** He attached the black wire from the Romex to a brass screw in the outlet, the white wire to a silver screw and the bare ground wire to both a green screw and the outlet box. **3.** Securing the box with galvanized screws, Kennedy shoved the outlet into the box. **4.** He fastened them together and mounted a weatherproof cover. Then he turned on the power and used a three-wire circuit tester to confirm the outlet was grounded and that polarity wasn't reversed. Smiling, Kennedy wished Christofi and Selfridge a merry—and safe—Christmas.

Mark Christofi and Mark Selfridge needed an outdoor outlet for their light display in North Reading, Massachusetts, and called upon *This Old House* electrician Paul Kennedy to install it. Kennedy brought a standard three-prong duplex outlet, a galvanized outlet box, drywall screws and a weatherproof outlet cover. Before running a 12-gauge wire (called Romex) from the breaker panel in the basement to the porch, he made sure the power source wasn't live. Then he made a small hole between two studs in the basement and pushed a strand of fish

wire up the wall cavity until an assistant on the porch could hear it scraping on the wall sheathing. The assistant marked that spot, and Kennedy came up to drill a pilot hole with a one-inch auger so he could feel for any wires or studs that might get in his way. **1.** The cavity was clear, so he drew a rectangle on the clapboard, using the outlet box as a template, and inserted his reciprocating saw into the hole to cut out a rough opening. Next, he fished the Romex up from the basement, poked it through the side of the outlet box and anchored it with the box's

(See Directory, page 145, for details and sources)

Debt can be a liability. But it can also be an asset.



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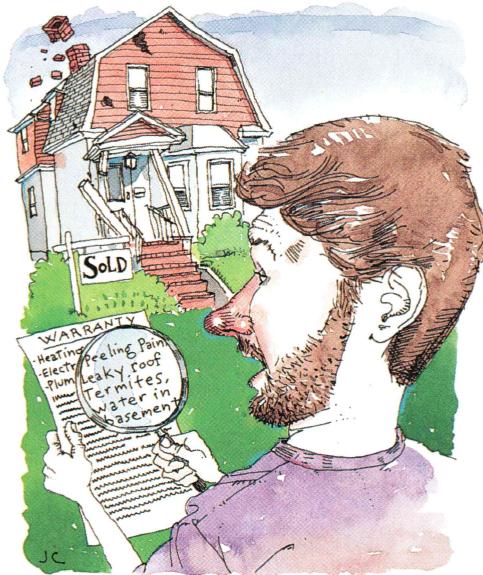
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Protection Money

Are home-equipment warranties just pricey peace of mind?

BY PATRICIA E. BERRY



When Ted and Sharon

Shafer of Tualatin, Oregon, put their 15-year-old split-level up for sale three years ago, the broker suggested they purchase a warranty plan for the eventual buyer. It would, he said, cover the cost of repairing or replacing certain appliances and equipment if they malfunctioned or broke down. The Shafers agreed, figuring that for a few hundred dollars it couldn't hurt to give the buyer some added assurance. They thought it might even help speed the sale. As fate would have it, something did go wrong—the kitchen range died—before the house was sold. But the Shafers happily discovered that when they signed the warranty purchase agreement, they too were covered.

For a \$35 service fee, a contractor sent by the warranty company determined that the range was beyond repair and replaced it with a new one. A few months later, the plan came in handy again when a dishwasher failed during installation and blew out an electrical circuit. Both were replaced, for that same nominal fee.

Tales like these make home-equipment warranties sound like a great buy. But considering how often appliances actually falter or fail, the price of protection may not be worth it.

A typical protection plan, available mainly through real-estate brokers, is a one-year renewable service contract that sells for \$255 to \$450, according to the National Home Warranty Association. (Prices are higher for houses of more than 4,000 square

feet.) The contract covers failures of main systems—electrical, heating, central air-conditioning and plumbing—as well as built-in appliances and fixtures such as dishwashers, faucets and water heaters. If a covered item breaks, it will be fixed or replaced for a service fee that varies by state from \$35 to \$100. To make a claim, a warranty holder calls the company's central or regional office, which then dispatches a local contractor to check out the problem.

The contracts don't cover freestanding appliances—refrigerators, window air conditioners, washers and dryers—although they can be included for an additional fee. To protect themselves, warranty companies also use preexisting-condition

disclaimers. If the contractor decides that a problem existed before coverage began, the claim can be disallowed.

Gail Hillebrand, litigation counsel for Consumers Union, warns that people who buy a warranted house "may have to prove later that the item was in good working order when they bought the house." Her advice is to bring in a home inspector and make sure he reports on everything covered by the warranty.

But Joe Fiorella, president of the products and services division of Electronic Realty Associates (better known as ERA, the national real-estate chain), says contractors aren't sticklers and that coverage exclusions apply to knowable conditions. "We will cover unknown conditions. Let's say there's a hot-water tank that goes out. It may already be rusting on the inside, but if there's no evidence of a leak, it's covered." (Responds Hillebrand: "Just be sure the contract spells that out.")

Warranty programs for preowned homes came into being 25 years ago to help brokers sell houses, and there is some evidence—albeit industry generated—that they do. ERA and other companies tout figures from a 1994 study conducted by the real-estate firm. The survey of 7,234 ERA-listed houses found that those with warranty plans were 25 percent more likely to sell during the listing period. They also sold for 2.4 percent more and 27 days faster than houses that didn't have the coverage.

"A one-year warranty came with our house," says Keith Hammonds, who bought a 1927 Colonial in Ossining, New York, three years ago. "It made us feel somewhat better about putting down money. We would have bought the house anyway, but the warranty was a nice touch by the seller to demonstrate her interest in our welfare."

A seller who signs on to a plan when listing a house doesn't have to ante up until the house sells, and only if it sells. Meanwhile, like the Shafers, sellers enjoy almost the same coverage (heating and airconditioning may be excluded). Details vary by company and by state regulations. If you file a claim as a seller, all you pay is the service fee, even if the house doesn't sell. When the listing drops, so does the commitment to pay for the plan.

But a good marketing strategy by a

service-fee cost. California, which has the country's lowest rates (\$250 for the contract and a \$35 service fee), offers a homeowner the best chance of coming out ahead using AHS's average figures. Of course, if everyone came out ahead, there'd be no warranty business.

AHS says it has tapped markets both in renewals and in sales to owners who aren't moving. Renewal coverage generally doesn't differ from what sellers and buyers get, but the warranties are slightly more expensive—\$30 to \$40 more per year—"because we don't have the checks and balances that we would get when a broker or a home inspector is involved in the process," says Crawford. Warranty companies count on brokers to be their eyes on a house's general condition and, if there is a formal inspection, to find out about any preexisting conditions that would be excluded from coverage.

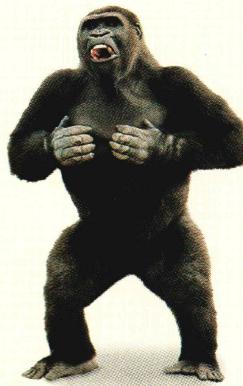
Although real-estate brokers usually make commissions on the plans, not all are fans. Stephen Krawse, owner of Century 21 Stephens in Denville, New Jersey, believes home warranties "have a tendency to overpromise and underdeliver. There is an awful lot of small print."

Fine print notwithstanding, it's sellers who have the most to gain from a warranty: the potential for a faster sale and a degree of protection from buyer recourse if something goes wrong. For buyers, a warranty probably isn't a savvy purchase. Unless they're looking at old appliances and equipment, it's not likely they'll recover the cost of the policy, given its short life. A better way to use the money might be to put it into a repair fund. Better still: Invest in a thorough home inspection. By revealing trouble spots, it can provide ammunition for negotiating the selling price or, if nothing else, getting the sellers to throw in a warranty if they haven't already.

If everyone came out ahead with these plans, there'd be no warranty business.

seller or broker and real value for a homeowner are two entirely different things. In the year he was covered, Hammonds never needed to file a claim, and when it came time to renew, he declined: "My general opinion is that companies wouldn't offer them if they didn't think they'd be making money. Why should I buy into the losing end?"

But one purveyor of warranty plans, American Home Shield, believes there's a case to be made for ongoing coverage. The biggest home-warranty company in the United States, AHS will have written half a million warranties in 1996, about 62 percent of the total market. Dave Crawford, vice president of sales and marketing, says the company pays an average of 2.4 claims per contract, compared with an industry average of 1.7 claims, and that for each claim it pays out an average of about \$150. That puts the average benefit to the warranty holder at \$360—which in most states is below the contract and



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A Letter From



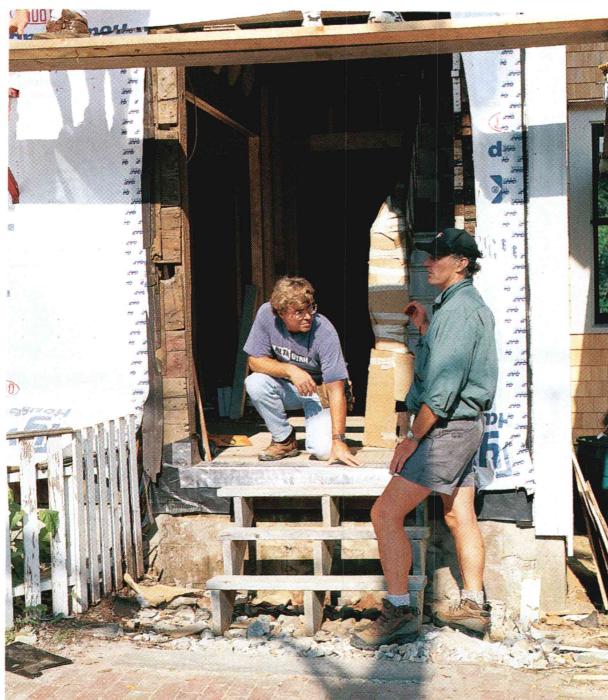
I knew there was a built-in icebox under my back stairs. It had been walled in sometime during the 1940s and again when I redid the kitchen in the 1980s. But now I needed some of that space: It would be perfect for recycling bins and snow boots. I knew I could get at it from the basement stairs. That was where the iceman loaded in his blocks.

The job would be fast and relatively crude, no finish carpentry, no elaborate casework. Armed with a flat bar and a reciprocating saw, I went to work. First I pried off the panels covering the back. I was about to cut them up when I took a closer look and saw they were meticulously crafted—pine panel doors joined with square dowels—so I decided to save them and went on with the demolition.

Behind the doors was a layer of sawdust insulation, still clean, the residue of ancient pines. I pictured a carpenter's apprentice sweeping it up and saving it in a burlap bag. Next I cut a hole in the back of the box and peered inside with a flashlight. It was beautiful in there. Tongue-and-groove pine glowed under many coats of shellac. The slatted shelves had been carefully fitted. Whoever built this, I realized, had spent days at it and exercised no small amount of thought and skill, even on details no one else would ever see.

I suddenly felt like a barbarian. But I needed the space, and there was no stopping. Inserting a long blade in my saw, I cut the icebox into manageable chunks and threw them away. Then, in a nod to the old carpenter, I reinstalled the panel doors in a tolerably artful fashion. It's hard to say what he would have thought—I bet there were times when he had to slice up some of his predecessors' work to make room for his own. But I'm a little superstitious, so I left some of that old sawdust as a peace offering.

Renovation often means destroying much of a building to give it a new useful life. Nowhere has this been more apparent than at the current Nantucket project, in which we gutted 80 percent of the original structure. The building went a hundred years without a major renovation, and our efforts should serve it well for the next hundred. Still, we thought we'd better leave some of the original work—the plaster moldings and medallion on the living room ceiling—as a peace offering.



New life from old: Steve Thomas and Bruce Killen at the front entry of 3 Milk Street on Nantucket.

Steve Thomas



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It's not that unusual to hear someone talk about their car. But in front of 200 people at a civic group luncheon? Or as a volunteer at a big-city auto show? These venues tend to be reserved for Saturn owners. So enthusiastic are they that some have been known to keep brochures in the trunks of their cars just in case someone asks, "How do you like your Saturn?" One woman even hands out the business card of her Saturn retailer at stoplights. We're not exactly sure what possesses them to do these things. Although we'll venture they're all pretty satisfied with the whole Saturn experience. Still, should you ever come across an owner and they talk your ear off, we apologize. Apparently, they just can't help themselves.



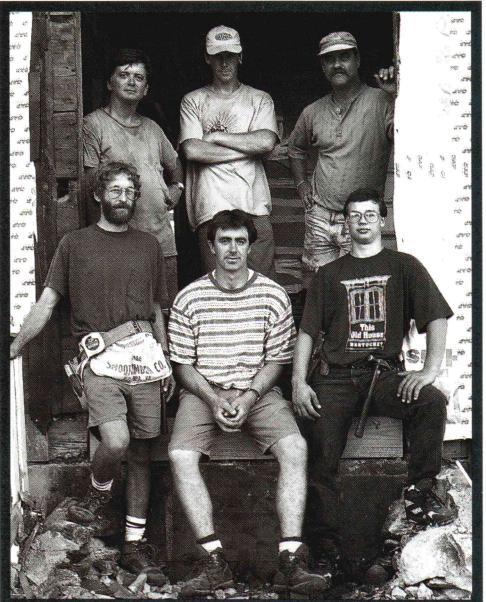
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This 1997 Saturn SW2 (with alloy wheels) and this SL1 have an M.S.R.P. of \$13,815 and \$11,995, respectively. Both include retailer prep and transportation. Of course, the total cost will vary since options and things like tax and license are extra. We'd be happy to provide more detail at 1-800-522-5000 or look for us on the Internet at <http://www.saturncars.com>. ©1996 Saturn Corporation.



LUCA TROVATO

On the job at 3 Milk (clockwise from upper left): Wes Stone, carpenter; Paul Sullivan, carpenter; Ric Emery, carpenter; Chris Welsh, electrician's assistant; Mike Lynch, carpenter; John Hassay, electrician.

THE TROUBLE STARTED when contractor Bruce Killen's crew began pulling up floorboards and looking behind the plaster. What they found was a house that clearly embodied post-Quaker thrift: a random collection of odd-size, recycled lumber teetering on rotting sills. This renovation wasn't going to be easy.

"We were more optimistic than we probably should have been," said *This Old House* producer Russ Morash. "You think of a Victorian house as a reasonably complicated example of high carpentry, but what evolved here was a horror show of structural defects." He stepped over a pile of splintered studs and shook his head. "Suddenly you realize that every wall, every ceiling, every window, every shingle, every brick, every joist is going to have to be removed before we're finished."

As Steve Thomas had guessed, the inspection of 3 Milk (reported on in the September/October issue) didn't catch all the problems. Working on the house did. The floors weren't level, the sub-

Nantucket Project Update

When Craig and Kathy McGraw Bentley bought the 109-year-old house at 3 Milk St., this fall's TV project, they knew it needed a lot of fixing up. As work began, the old Victorian revealed even more of its flaws

By Jack McClintock



With the gable-end wall for the south-side bump-out fully framed, the crew lifts it into place. The wall will be held up with temporary bracing while the rest of the roof is framed in.

Before

floors were a wreck, and the joists, as Killen put it, were "punk and nail-sick." The plaster concealed flimsy, substandard studding that would never support the weight of a new roof. Neither would the skinny, far-apart rafters, some of which drooped five inches. The water damage wasn't minor after all. And the furnace, once believed usable, wasn't. Heating pipes had burst sometime between Craig and Kathy McGraw Bentley's bid on the house and the closing, spewing what Kathy called "black goop" all over everything. It seemed the only good news was underneath: The foundation was solid enough to support what was to become, in many ways, a brand-new house.

But the Bentleys didn't want a new house. They wanted to restore an old house. And now, in early August, it seemed their preservation effort would be more symbolic than real—not to mention, as Kathy noted more than once, "a lot more costly than we ever expected."

Problems notwithstanding, things were progressing. Killen's crew had torn off the single-story kitchen wing and replaced it with two stories housing a family room downstairs and master suite upstairs. They had bumped out part of the south wall to make more space for a downstairs study/guest room and a bedroom and bath upstairs. The house never had an upstairs bath; now it would have two. The bump-out, along with two gable dormers and a new side entryway, would also add visual interest to what had been a plain, flat wall. The new entry, with its bracketed overhang, would lead through a mud room into the new kitchen in what was formerly the dining room. With the dormers, larger windows and glass doors in the new additions, designer Jock Gifford sought ways to bring in more light.

There was still plenty to do—and even a modest Victorian puzzle to amuse the crew as they worked. Traditionally, if a Nantucket house had both shingles and

clapboards, the "classier" claps were placed on the front to impress passersby. But at 3 Milk, clapboard covered the sides and rear, and shingles faced the street. Why? No one could figure it out.

Meanwhile, not only was the renovation costing more, it was also threatening the schedule. The Bentleys still hoped to move in for Thanksgiving, but the unforeseen need for new joists, rafters and interior bearing walls might get in the way of that. The extra work might also affect the initial \$250,000 estimate. On camera, Steve Thomas turned to Kathy and asked how she felt about going over budget—at this point to the tune of about \$30,000, split evenly between labor and materials. Kathy paused a moment and then answered. "We're concerned about the numbers. They're certainly not what we anticipated."

After some thought, Kathy said later, she and Craig realized that they had to rethink some of their expectations. For example, they decided that the labor to rehabilitate the old pine floorboards would be too great. And perhaps they'd be able to contribute some sweat equity by stripping the interior doors, painting and wallpapering.

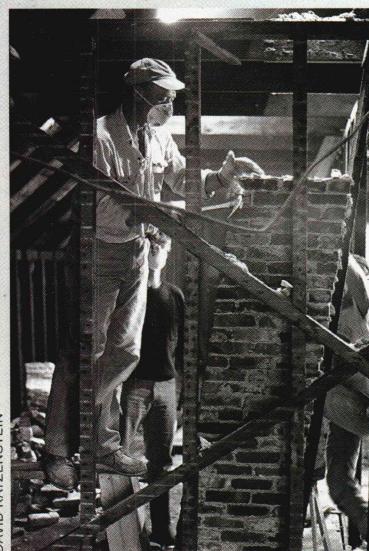
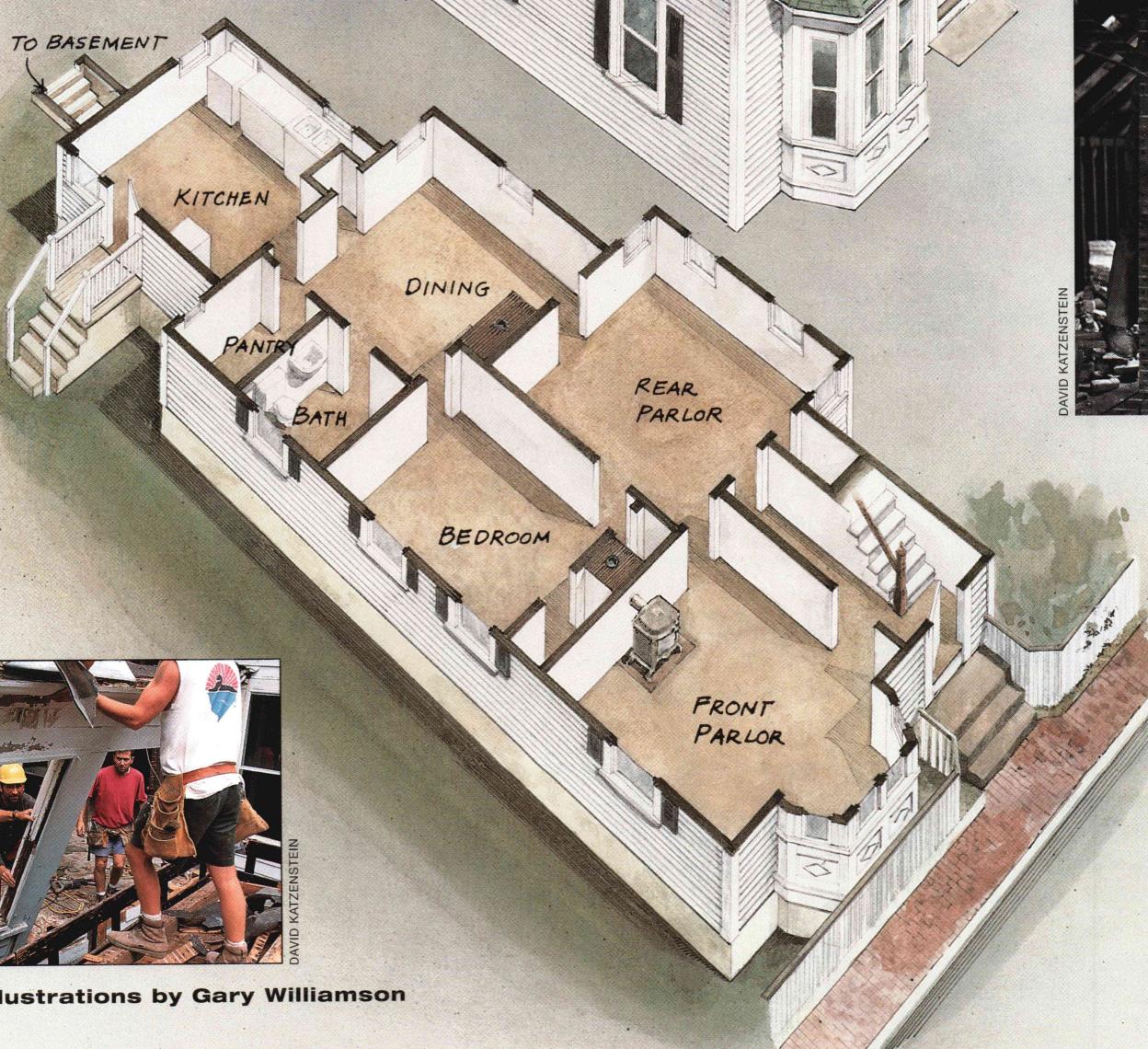
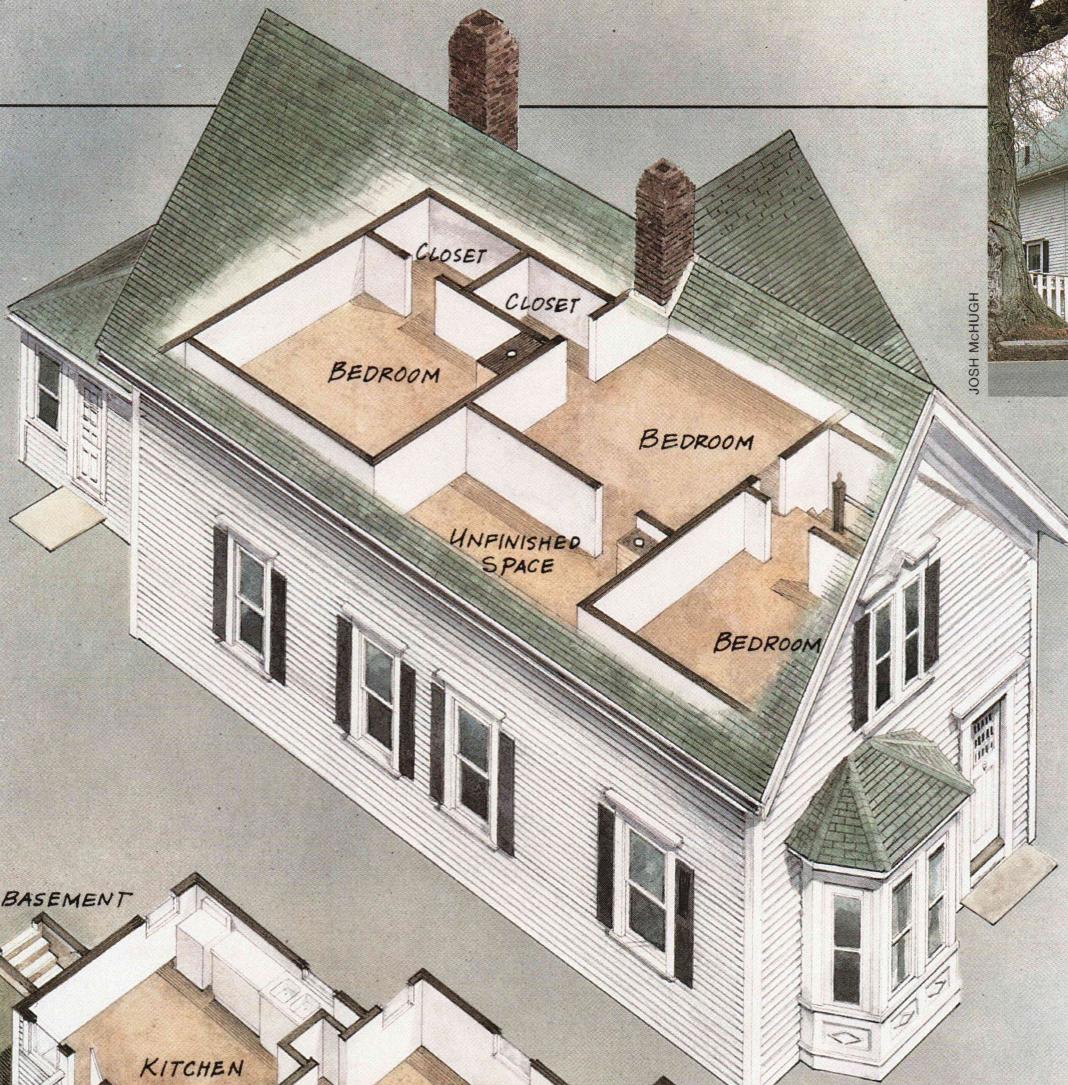
Everyone agreed that the \$30,000 overrun was unavoidable. To Bruce Killen, it was a familiar dilemma: "Do you fix up what's there or replace it?" More of 3 Milk's original structure could have been saved, as Russ pointed out, but at greater cost. You can patch, shim, prop up and sister on, fish wires and encapsulate lead paint, but the labor is expensive. "If you're going to restore a building and live with its original defects," he continued, "every trade has to be sympathetic. But today's carpenters don't like dealing with out-of-plumb, out-of-square and under-engineered conditions. When a building is as far gone as this one was, it's better to cut back, rebuild and do it right."

Better, but not always easier. On Nan-

The house at 3 Milk St. was old-fashioned, built for another time. And everyone knew from the start that much was needed to bring the house up to date aesthetically and functionally. The floor plan told the story: cramped and illogical. There were two parlors, side by side. One of the bedrooms was downstairs in the public area, reachable only through the dining room or rear parlor, yet there was unfinished space upstairs, used mainly for storage. The



only bathroom was downstairs, off the dining room. The kitchen was sizable but out of date and set in a shed-like structure that seemed stuck onto the back of the house. To transform this plain house into a tasteful Victorian for today, designer Jock Gifford would take off the kitchen to make way for an addition, reshape the floor plan and restore or renew every bit of visible surface.



Illustrations by Gary Williamson

After

The first noticeable change in the house at 3 Milk St. is its crisply shingled roof, crowned by the new chimney that rises from the family room fireplace. On the south side, the new bump-out adds visual interest to a formerly flat wall and allows a more logical interior layout on both floors. Also on that side, a new entry passes through a mud room to the relocated kitchen. It sits between the formal dining room and the informal family room, whose large windows and glass doors give it the most spacious feel of any room in the house. There is still a



bedroom downstairs—now with its own bathroom—that will double as a study. Upstairs, the master suite has a dressing area and bathroom. Another bathroom serves two children's bedrooms and a playroom. New gable dormers and larger windows admit more light. And out front, under a bracketed overhang, the original double entry doors will be restored to their rightful place.

tucket, renovators must deal not only with the Historic District Commission (HDC), which reviews proposed designs for historical appropriateness, but also a state requirement that comes into play if the cost of a renovation is 50 percent or more of the building's current value. For those projects, contractors are obliged to bring the entire building up to code, not just the parts that are being worked on. The rule has helped preserve a lot of old Nantucket buildings—and driven contractors about 50 percent crazy because it requires them to make tough decisions about how much rebuilding is practicable.

As the determined keeper of the island's architectural heritage, the HDC can affect a job's timetable—and budget—as well as its design. The elected, five-person board publishes a detailed set of guidelines for Nantucket renovation and administers them at mostly polite weekly meetings where "inappropriate" design is discouraged—or flatly rejected. Nixed recently were an elaborate Egyptian Revival entry-way proposed for a simple captain's house and an enormous Tudor Revival home with numerous heavy turrets and chimneys. The Bentleys had requested some Stick-style open fretwork for one gable end, but when board members criticized it—politely—the proposal was withdrawn.

Because most designers and contractors who come before the HDC are locals and know they'll be returning with another project next month, negotiations usually end in agreement, not acrimony. "Nantucketers know we're working in their interest," said Patricia Butler, the board's administrator.

Only occasionally does a homeowner's disappointment lead him or her to bring a lawyer to an HDC meeting, and the gambit seldom succeeds. Usually, Butler says, the lawyer ends up persuading the client of the futility of fighting the commission. The last time a court overruled an HDC ruling was in the 1960s, and even then the project, a gigantic motel, was so unpopular locally it was never built.

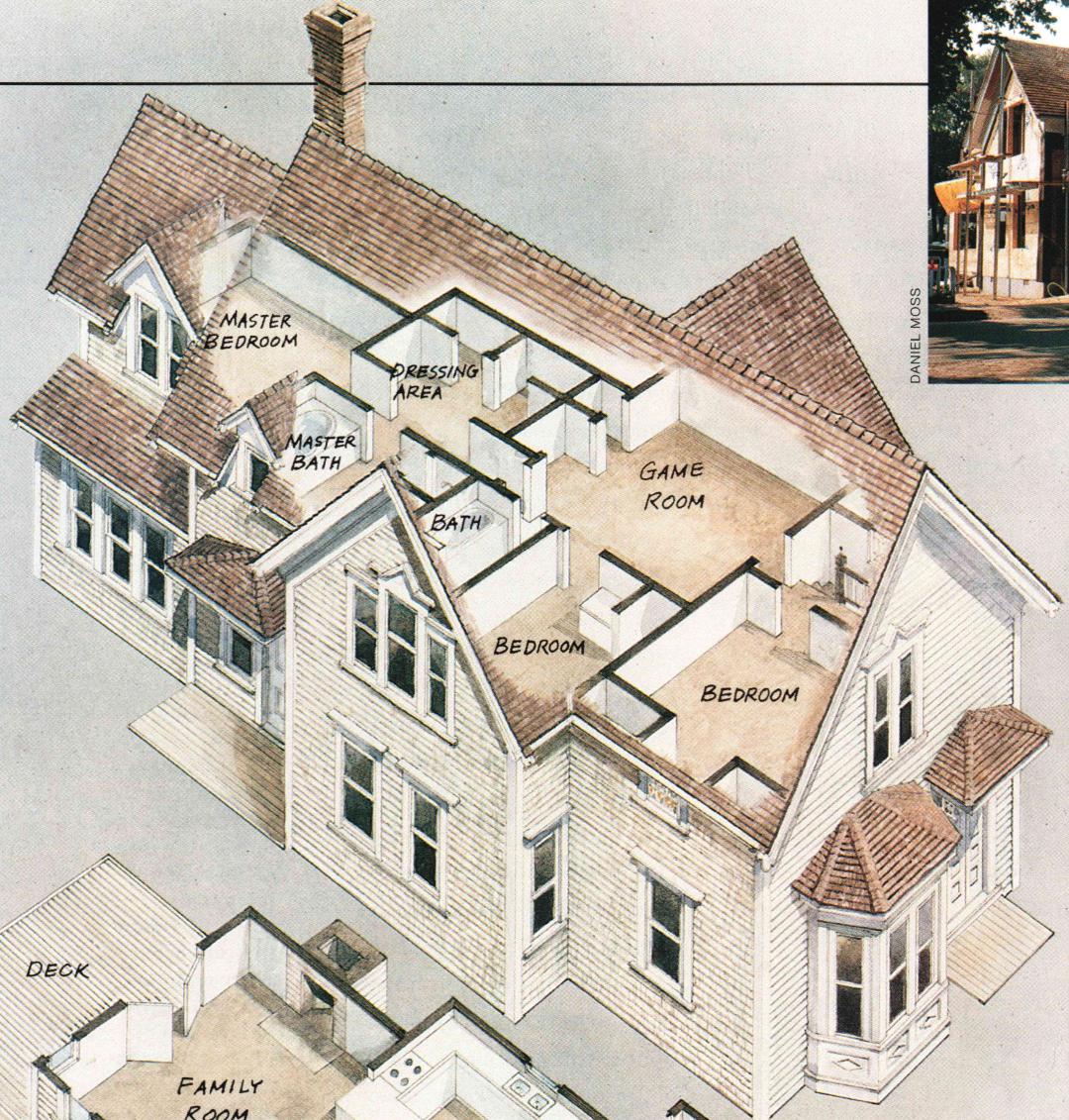
At 3 Milk, HDC oversight sometimes had a ripple effect on decision-making. Take the windows. Norm Abram had hoped to reuse the old sash with their rippled glass that made every glance outside a reminder of another century. But the cost of restoring them would have been overwhelming, so the Bentleys decided to go with factory-built windows. This choice led to a new set of complications centered on paint color. The new windows were to be factory-painted, but that meant the color had to be selected immediately, and both the window and wall colors had to be approved by the HDC. So: What colors?

Jock Gifford scraped the old sash and found the first coat was a dark red. It was authentic: Victorian trim colors were usually darker than the body of the house. But nowadays white is the most common choice on Nantucket, and the HDC prefers it. As Gifford said, "The HDC doesn't speak Victorian." Kathy didn't like the original color anyway. She and Craig bought paint samples, slathered blues, reds and greens on old planks, narrowed the choices to "juniper" or "tundra" and proposed those colors to the HDC. At the same time they proposed a skylight and an exterior chimney.

That was the chimney's second time around. The HDC had accepted Gifford's floor plan, the bump-out, the family room and master suite and the new upstairs bathroom but had rejected the skylight over the game room and the exterior chimney. Metal-framed skylights aren't allowed, they said, and the chimney was "too suburban." They asked that it be moved inside the house.

But then the chimney would narrow the downstairs family room by three feet to only 13 feet wide, and steal two feet from the 13-foot-wide master bedroom. The Bentleys resubmitted the request, and this time they got everything. Just build the skylight's frame and sash of wood—no plastic-and-metal prefabs on Nantucket—and add some Victorian detailing to the chimney brickwork,

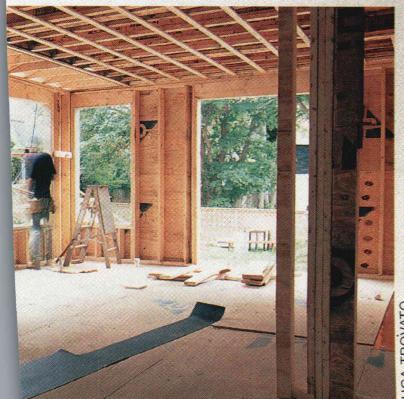
DAVID KATZENSTEIN



DANIEL MOSS



DANIEL MOSS



LUCA TROVATO

which Gifford thought a fine idea. The exterior colors were approved: cream for the walls, light gray for the trim and tundra—an eggplanty purple-brown—for the sash. Eminently Victorian.

In the meantime, a lot of work had been put on hold, awaiting the HDC ruling. The day after it came, Killen's crew tore off the rest of the clapboards and readied the walls for new siding. Dan Kissel's masons were pouring wheelbarrows full of concrete into a hole for the chimney footing. Electrician Sally Bates

"Then they'll hang the rock," said Killen. "And the shingles will fly up," added Gifford.

Before that, exterior walls would be insulated, the skylight completed and the Victorian chimney erected. The new oak flooring was on order. Kathy and Jock were still discussing details of the new kitchen. Should it have a pressed-tin ceiling, and exactly how far should the ceiling extend into other rooms?

Soon this and all the other design decisions would be made. Kathy said she

would miss this part of the process and working with Gifford. "I'm a little sad it's over," she said. "It was fun, and Jock really gave us tons of time." As for the added expense, it hurt, but in the end, Gifford didn't think twice about it: "We made the right decisions."

The windows were on the way. Only one more decision hung before the historic commission—whether to permit restoration of the house's original double front doors, which Craig had found in the crawl space under old boards, bottles and high-button shoes. From an antique photograph it was clear the doors were original, so everyone was optimistic. Finally,

3 Milk St. had a fixed, predictable timetable and budget. "There's no excuse for the unforeseen now," Russ said. "We've basically got a new building here. No more surprises."

Killen had even, he thought, solved the mystery of why shingles were on the front of a clapboard house. In 1918, when the owners replaced those Victorian double doors with a narrower single door, and therefore had to re-side the front wall, times were tough on Nantucket. Clapboards were expensive. "It was cheaper for them to buy shingles," Killen said, replacing his baseball cap and heading upstairs to check in with the electrician.

The house's new windows are all custom-made with factory-applied trim.

LEFT: A classic trio of double-hung units is hoisted up to the peak of the new south-facing gable end.
RIGHT: Standing proud under a cedar-shingle roof, the new incarnation of 3 Milk awaits the addition of more windows and clapboard siding.



LUCAS TROVATO

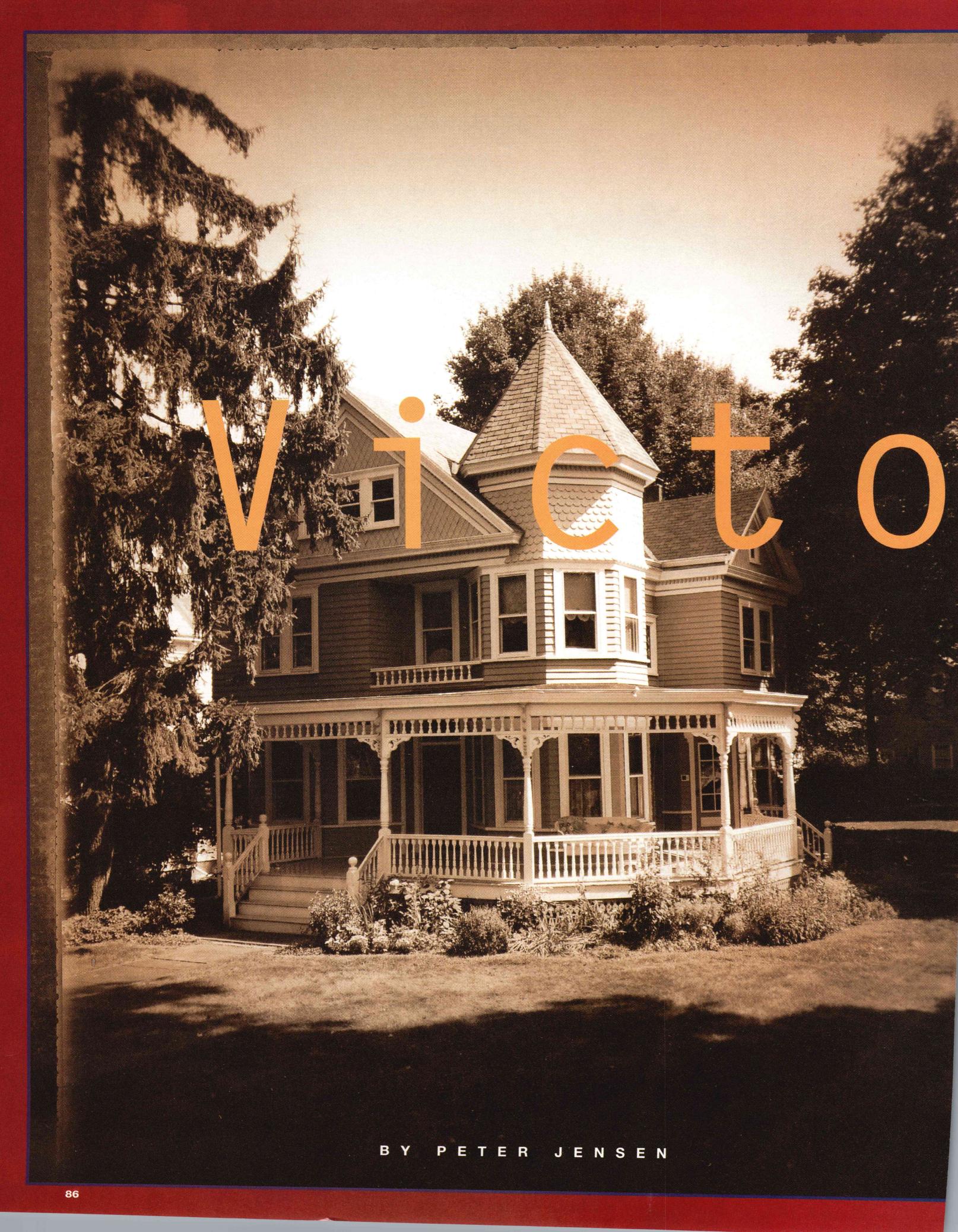
was laying out switches and outlets. Butch Ramos and his plumbers were running PVC pipe through the walls, and Butch's brother Bob was drilling wells for the ground source heat pump that would replace the defunct heating system (and bring air-conditioning to the house for the first time). Three Milk St. had a spanking-new red-cedar shingle roof instead of the old green asphalt Kathy had tagged "completely hideous." Things were moving again.

"It's good to see the subs here," Bruce Killen said, taking off his baseball cap and rubbing his head. "It's a real milestone." The windows would be installed when they arrived in mid-August.



DANIEL MOSS





Victo

BY PETER JENSEN

rain

It was usually late in the afternoon when my great-aunt Helen settled into a favorite chaise lounge on the huge porch of her Queen Anne Victorian. Built on a hillside above the St. Croix River in Wisconsin, the green-and-white shingled house rose three stories into the treetops. It even touched the sky, having been struck once by a finger of lightning and set afire.

During my visits, the 60-year gap between Aunt Helen's fin-de-siècle childhood and mine in the 1950s melted as easily as ice cubes in the sun teas of summer. What brought us together was her patient ear, spirit of adventure (while in her seventies she drove with a friend to Guatemala) and most of all, that grand, mysterious, embracing house. My grandfather spent his boyhood sleeping on the third floor beneath a Palladian window, and in summer, he was allowed to sleep downstairs on a squeaky iron bed at one end of the cool porch. Many years later, the child in that bed was me.

I didn't realize it then, but this small-town house was once a modern marvel, one of millions from an innovative, exuberant period that began a generation before the Civil War and turned the corner—barely—into the 20th century: the Victorian era.

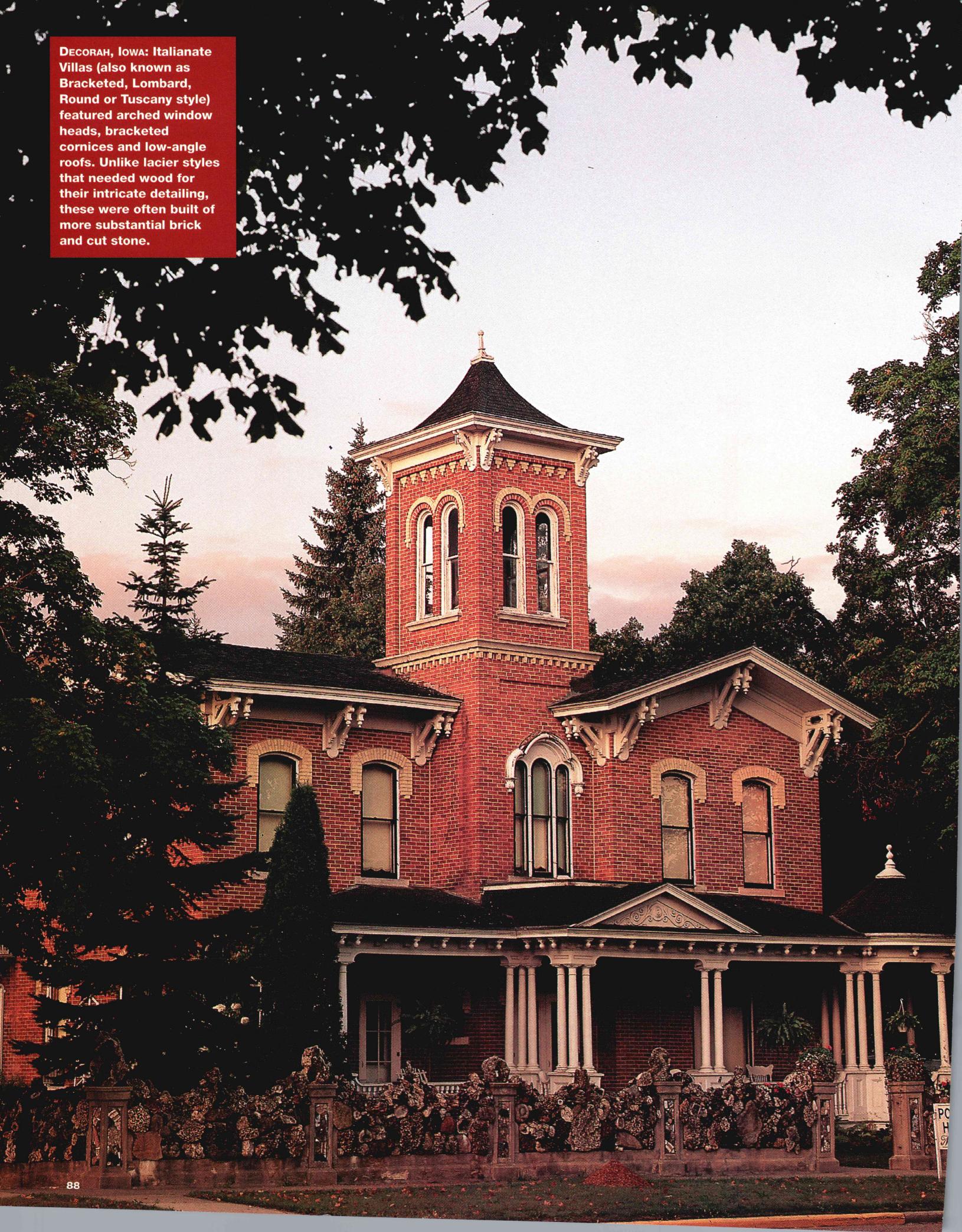
They were
the first
modern
houses,
built
everywhere,
and for
everyone

(LEFT) RHINEBECK, NEW YORK: An eclectic grouping of shapes, especially gables and corner turrets, accented with patterned shingles and banded by an encircling veranda characterize a typical Queen Anne.

Today, at the turn of another century, many new houses are reaching back for basic Victorian features. High ceilings, peaked dormers, porches and verandas are again popular, as are labor-saving devices such as dumbwaiters and laundry chutes. Manufacturers of fans, lighting fixtures, tin ceilings, siding, trim and other products also are doing a good business in Victorian-style reproductions. The period from which they're drawn, defined by Queen Victoria's reign from 1837 to 1901, was one of non-stop invention and creative expression that was mirrored by what ultimately became, despite European roots, a very American architecture.

We feel we know Victorian houses because they are everywhere. Like winged seeds from a fertile plan drawer that first slid open on the East Coast, they whirled their way from sea to sea, Gulf to Great Lakes. As mansions or cottages, row houses or ramblers, they dropped into the architectural gene pool of every city and town. Spurred by the popularity of plans books and a number of construction and materials breakthroughs, they were, despite their intricate gingerbread, affordable. In the mid-1870s, a new house (lavish to our eyes) could be had for \$3,000 to \$7,000. A working-class cottage built from a design

DECORAH, IOWA: Italianate Villas (also known as Bracketed, Lombard, Round or Tuscany style) featured arched window heads, bracketed cornices and low-angle roofs. Unlike lacier styles that needed wood for their intricate detailing, these were often built of more substantial brick and cut stone.





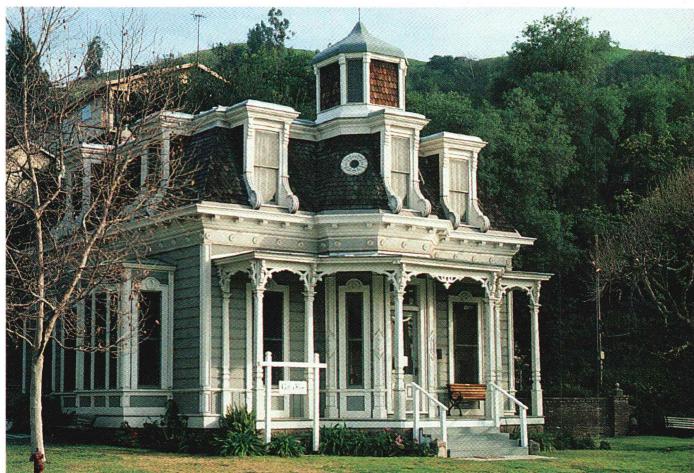
ASPEN, COLORADO: Elaborate ironwork, mass-produced in Victorian-era factories, gave character to the simplest houses.

in the plan book *Pelton's Cheap Dwellings* of 1880 might run \$585—not bad, considering a waiter or factory worker could make that in a year. How many of us today can add up a year's worth of paychecks to equal a mortgage?

The long list of names for Victorian styles and substyles intrigues—or stupefies: Gothic Revival, Swiss Cottage, Italianate, Exotic Eclectic, Second Empire (a.k.a. French mansard), Stick, Eastlake, Octagon, Queen Anne, opulent variations like Chateauesque and Richardson Romanesque and a few dozen more.

Rather than try to identify every style I see, I prefer to let my eye wander over the many details common to Victorians all over the country. I appreciate them in new combinations or search for some evidence of an artistic hand. Once, while sitting on a bench in San Francisco's Lafayette Park, I trained my binoculars on the surrounding houses to examine third- and fourth-floor details and got lost in amazement at layers of shingles, knee braces and brackets—multistory wooden suits of

LOS ANGELES, CALIFORNIA: As if zippered with cut stone, this Italianate's quoins are all illusion: Victorians used wood to replicate anything they saw in classic stonework.



LOS ANGELES, CALIFORNIA: Mansard roofs typify the Second Empire style's French fascination in the time of Napoleon III.

armor, complete with heraldic medallions. A tap on the shoulder spun me around. I was face to face with a stern-looking cop.

"Just what is so interesting in those houses, sir?" he asked.

"Oh, I'm not looking *in* them!" I replied, and started to hand him the glasses. "It's what's *on* them. It looks like the paint is all that's holding that one up. And over there..." He walked away.

To the public eye, Queen Anne is probably the most familiar style, perhaps because it flourished in the 1890s, near the era's end. But it also has most of the elements we've come to expect in a Victorian: a sense of height or castlelike verticality (even if the house rambles at its base or is just one story), towers (often with conical roofs), gables, arched windows, spindled verandas, elaborate shingling, rounded bay windows (sometimes part of the tower) and more, and more, and more.

You can also appreciate Victorian houses for the way they embody ideas. It was, after all, the age in which phonographs, cameras and cylinder locks were introduced. My fascination with this other side—the innovations within any style's charac-

FRENCHTOWN, NEW JERSEY: Add a tower and smooth stucco walls, and an Italianate becomes a Villa style. Towers were vestigial lookouts, often unused and even unfinished inside.





SAN FRANCISCO, CALIFORNIA: The West's great repository of row houses saw almost 50,000 Victorians of all kinds built between 1850 and 1915. Here the gap between houses is luxuriously wide: Often it was only an inch or two of daylight as builders made the most of slim 25-by-100-foot lots. Viewed from the street, false fronts give the illusion of greater height.



SAN FRANCISCO, CALIFORNIA:

Victorians were inveterate world travelers, most of them via the works of popular author/adventurers such as Sir Richard Burton. One expressive soul felt that nothing was too exotic for his own palace, and blended Moorish, Indian, Oriental, Arabian—even a Scottish castle parapet—to create this Picturesque-style pastiche.



teristic exterior—began on Aunt Helen's porch. I remember hearing some family apocrypha that her upstairs bathroom, the only one in a five-bedroom house, was “the first in town.” Did that mean it was the first true “bath room” (sink, toilet and tub in one space)? Or, less amazing but still impressive, the first to feature the flush? No one today remembers.

I do know that it was a long way from porch bed to bathroom at 2 a.m. Push open a heavy front door with ornate brass knobs and hinges. Sneak past the newel post (it looked like a fierce giant chessman). Dash up the stairs, down a narrow hall. Choose from a maze of doors (avoid those emitting loud snoring). Use facility. Pull chain to unleash a Niagara of water and terrifying noise.

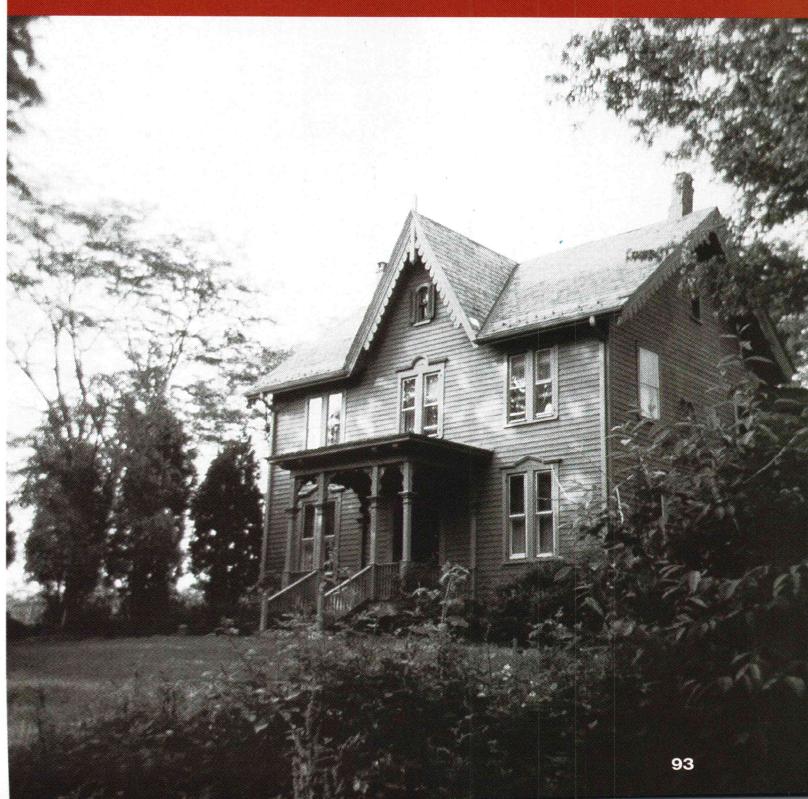
Victorians were obsessed with bathing, and for them every detail of a bathroom deserved consideration, especially if it meant improved efficiency or comfort. Richard D. Reutlinger, owner of an 1886 Italianate house in San Francisco, showed a visitor a capped gas-pipe stub protruding from the wall of his bathroom at waist height. “That line was for heating a small kettle of water right by the mirror for shaving,” he said. “I’m still looking for the complete fixture, and I’ve been working on the house for 30 years.” Until then, his morning routine won’t be perfect.

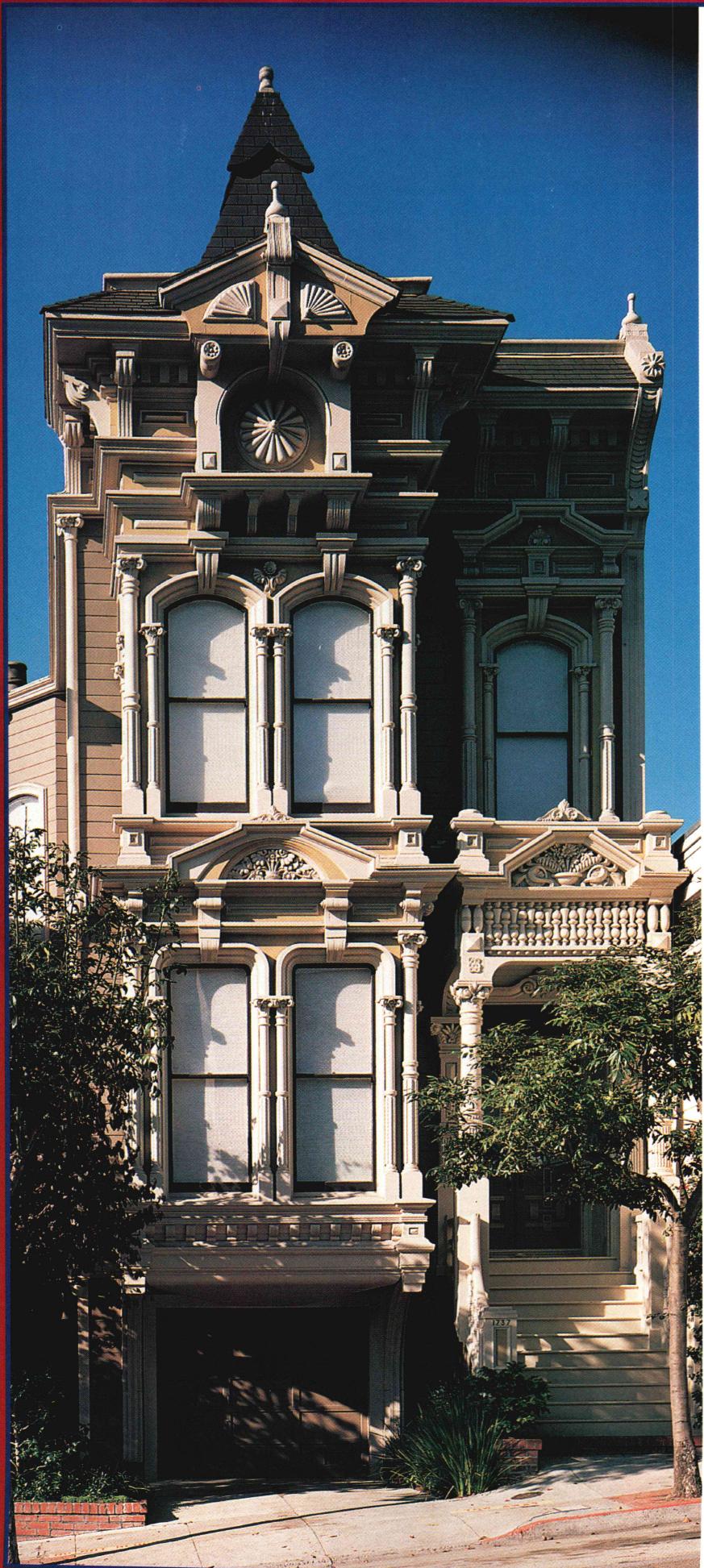
Victorians anchored all that frothy trim with some pretty solid (and again that word, modern) construction techniques. They were the first to use balloon framing, which had been developed in Chicago in 1832. To make multistory exterior walls, carpenters used long 2x4s with such speed and efficiency that putting up a house seemed as easy, it was said, as blowing up a balloon. The method required less carpentry skill too, a huge advantage as the transcontinental railroad stitched together frontier and West Coast cities, and towns boomed in the wake of the gold rush. Reutlinger’s house, it should be noted, wasn’t built by a casual contractor interested in saving on materials and labor. Between floor joists that are twice the normal width are four-inch layers of packed sand supported by perfectly fitted redwood shelves. This was noiseproofing, and it worked: The original owners couldn’t hear their children roller-skating on the basement dance floor, and even today the floors feel as solid as concrete despite having endured several earthquakes.

Double-hung sash windows, invented in the United States, offered the benefits of easy ventilation and a clean look free of Colonial-style panes and muntins. As manufacturers began producing glass in larger sizes, designers could bring in more light and views. Insect screens soon followed, a godsend in mosquito country like my Wisconsin hometown. Bay windows extended interior space out over sidewalks in crowded cities or were used simply to capture a



BUCKS COUNTY, PENNSYLVANIA: With its bristling hairdo of decorative iron crestings, above, a stout Second Empire structure stretches for a sense of greater verticality. A simple exterior, below, takes on a churchlike look with the addition of fancy, scroll-sawn bargeboards at steep eaves. Gothic Revival fairly drips with the architectural confection we think of now as gingerbread.





broader view. (They may be the easiest way to identify three of the era's most prominent styles: Italianate houses had slant-sided bays, Stick-Eastlake bays were squared and Queen Anne, rounded.)

We're only touching the surface when we marvel at some of the innovations of this time—hot-air central heating, ventilation ducts, telephones, non-electric “air phone” intercoms, gas lighting, followed by Edison's incandescent bulb—and the fascination with mechanical gadgets, especially the bicycle and home sewing machine but also carpet sweepers and hundreds of other small but useful items.

New woodworking machines made it possible for mills to mass-produce millions of mix-and-match finials, pediments, cornices, brackets, fish-scale shingles, dentils and other fanciful gewgaws. Catharine E. Beecher, author of several books for women on harmonious family life, was the first to indicate directions of door swings on house plans and went into great detail about how to lay out kitchens and other work spaces. She advocated meticulous organization, knowing that the average American woman did most of her own housework.

Inside, a room for every person and every function created an orderly warren, albeit a tight one. Other defining elements of Victorian style include rich interior details, art glass, elaborate fireplace mantles, front and back parlors, libraries, “fantasy” rooms in Turkish or Egyptian motifs, skylights and bric-a-brac. In a time of vigorous technological innovation and creative, eclectic expression, life was extraordinarily fast-paced and complex for these people. They embraced it and hoarded objects and time, searching for meaning and self-improvement along the way. Sound familiar?

When my aunt died this year at age 98, her house went right on the market. Certainly, I thought of buying it. My father said he'd been in the basement, barely touched a window, and it fell apart. My mother reminded me, “There's only one bathroom, and all those bedrooms!”

But I dreamed. Within a month I heard it had been purchased by a Montana writer, the daughter of my aunt's best friend, who'd grown up in the same town and felt like coming home. She'd soon find out: Despite its age, she'd bought herself a modern house complete with a century of memories—even if it is a long way to the bathroom.

◆ See Directory, on page 145, for details and sources



(OPPOSITE PAGE) SAN FRANCISCO, CALIFORNIA: One of the city's great Eastlake-style houses, with rank after rank of turned, carved and scroll-sawn details, is a house-painter's dream—or nightmare. The best tipoff to identifying this style, named for English designer Charles Locke Eastlake (1833-1906), is the spindle screen above the entry.

NANTUCKET, MASSACHUSETTS: This asymmetrical facade has the holy trinity of Victorian exteriors—a front porch, an elaborate entry and a big bay window.





hammering out a

kitc

At the Nantucket house, Kathy and Jock trade ideas and nail



THE KITCHEN AT the fall project house on Nantucket is a very small room—even smaller than the master bath—yet it has stolen more time and energy from designer Jock Gifford and his client, Kathy McGraw Bentley, than any other part of this renovation.

Settling on a location for the kitchen—at the hub of the house's traffic flow, between the family and dining rooms—was easy. And a layout for cabinets and appliances quickly followed. But progress slowed as Kathy and Jock became mired in talk of colors, flooring, counters, lighting, trim, even the style of drawer pulls.

Jock wanted the kitchen to reflect the house's Victorian heritage and Nantucket's relaxed, we're-on-vacation mood. It should, he said, be comfortable and summery. Kathy, on the other hand, wanted the house to accommodate a constant stream of visitors. She and her husband, Craig, planned to be there for every major holiday. She wanted more formality.

With an easy confidence, Jock argued persuasively for design elements he favored. Kathy was cautious, wary of making quick decisions she might regret later. Both of them were also feeling the pressure of television. *This Old House*'s audience of millions would soon see the results close up.

Time was running out in the construction schedule, so instead of trotting around to showrooms—the usual routine—Kathy and Jock decided to visit two of their favorite kitchens. Each kitchen, recently remodeled, was light and open, but that's where the similarities stopped.



SPARKSHouser Photographic Services Inc.

The Bentleys' kitchen was moved around a lot on paper before it landed in this 133-square-foot niche across from the mudroom and adjacent to the family room. Converting raw space into a finished plan took months of meetings between designer Jock Gifford and owner Kathy McGraw Bentley, top. Kathy recently settled on a commercial-style range, above, and wooden rope molding, right, for crown molding and edge decoration.



DARRIN HADDAD

hen

own a plan by wendy talarico photographs by daniel moss

kathy

was crazy about her neighbor's Nantucket kitchen. The white-and-beige color scheme, painted wood floor, beveled-glass window and mural-on-tile backsplash made it a room she could easily call her own. "It's warm and refreshing and expansive," she said. "And it's done—every detail has been thought through."

She liked the no-nonsense look of the commercial range and the way the refrigerator and dishwasher were hidden behind panels that matched the cabinet doors. She liked the crenulations in the crown molding and the ornate, half-round pillars that punctuated the cabinet runs. She liked the look and practicality of the stainless-steel sink and the glossy counters.

Jock, meanwhile, was staring long and hard at the ceiling—white bead board overlaid with beige lattice. He glanced at the intricate cabinets, fiddled with the knobs on the massive range and ran his hand over the wood floor to feel the finish. Kathy asked what he thought. "For what it is," he replied, "it's beautifully executed."

As they went through the elements one by one, it seemed the very things Kathy liked most—the embellished woodwork, the complicated floors and ceilings, the fancy tile—were the things Jock liked least. In Kathy's ideal kitchen, everything would match, and everything from the toaster to the can opener would tuck away in tidy compartments. "This probably sounds silly," she said, "but I've always wanted a hood that matched the cabinets."

Jock felt appliances should look like appliances, not cabinets. They should be well designed, like the commercial-style range in this kitchen, but not pretty.

Kathy said, "I don't want a big metal hole in the middle of all these pretty cabinets." Jock paused; she paused. Finally, he said: "Let's



Kathy liked the way a tile mural in the backsplash of her friend's white-and-beige kitchen introduced a dash of color.

see what the appliances look like first. If you pick that range with the downdraft exhaust, we don't need a hood."

Kathy said she would like a tin ceiling. "It's historic and pretty, and otherwise ceilings are so blah," she said. Jock demurred. In most Victorians, he pointed out, embossed tin would have fancied up the front rooms, not the kitchen.

Another detail provided cause for agreement. Pointing to the half-round columns between some of the cabinet doors, Kathy said: "Can we use something like these?"

"I had something like them in mind," Jock said, "but a little simpler, to finish off the back of the peninsula where it faces the family room." He said the columns were a

furniture detail that could help blur the distinction between the two rooms and make the kitchen seem more accessible. "You don't want to feel walled off, like the party's in one room and you're in the next," he said. The open plan would also make each space appear to be larger.

Kathy liked what she was hearing. "Then we'd use the same details in the family room, right Jock?" He nodded in agreement. They decided to meet at the airport the next day to fly to a neighboring island, Martha's Vineyard, for a look at one of Jock's favorite kitchens.

An island separating the kitchen from the adjacent family room appealed to both Jock and Kathy.



jock

was eager for Kathy to see, and like, the kitchen he designed at the back of an enormous Victorian presiding over a small neighborhood at one end of Martha's Vineyard. He seemed happy to be in the house again.

Three years ago, Jock planned the top-to-bottom restoration of this house. Its colors were vivid, its style boisterous. The kitchen, however, was



Turned legs and moldings give the island in the Martha's Vineyard kitchen the look of furniture.

"It's seamless; like you're cooking in the family room."

Kathy liked that, but she was having a hard time getting beyond the room's simplicity. There wasn't any storage for small appliances, no fancy wallpaper and the windows were bare, without curtains or shades.

Like the kitchen at 3 Milk Street, this one was small, with a C-shaped run of cabinets. Where Kathy's would have a peninsula separating and buffering it from the family room, this kitchen had an island. Except for the soapstone counters, everything was white. And there was beadboard—to Jock the Victorian equivalent of plywood—everywhere. The milled pine covered the walls, ceiling and even the backsplashes behind the counters.

When Kathy and Jock first began talk-

straightforward. To Kathy it seemed "stark and utilitarian."

"That's the way the Victorians did it," Jock said. "The back of the house was all business." But this kitchen wasn't all Victorian, either. "See how the kitchen segues into the family room?" he asked. It was similar to the layout for the kitchen at 3 Milk Street.

ing about the kitchen, she rejected bead board.

But during this visit, she pulled out a brochure showing the cabinet doors she wanted: simple and off-white, with stile-and-rail frames and bead board panels. Although the doors were more an interpretation, not an authentic rendering, of Victorian style, Jock was pleased Kathy liked them.

Still savoring the room's details, he said, "I love these light fixtures. They're just like the ones they had at school when I was a kid."

"I remember them from meat markets," Kathy said. "I think I'd like something with a little more detail."

That launched a lighting discussion. The two agreed to put a pair of pendant lights over the peninsula. Elsewhere, they decided on undercabinet lighting and ceiling accent lights.

"Everything in here, the hardware, the light fixtures, the pulls, has a silvery finish," Kathy noted. "What if I want brass hardware? Will it clash with a stainless-steel range?" Jock recommended trying different metals on the cabinets before deciding. He wasn't worried about brass with stainless steel.

"What about these crystal pulls, Jock?" Kathy asked, pointing to photos of gaudy glass knobs in one of her catalogs. "Yes? No?"

Jock smiled. "I keep picturing my grandmother's kitchen; she had these," he said, pointing to the chrome cup pulls on another page. "They're so simple and old-fashioned." "I think everyone's grandmother had these," Kathy replied. "I like them too."

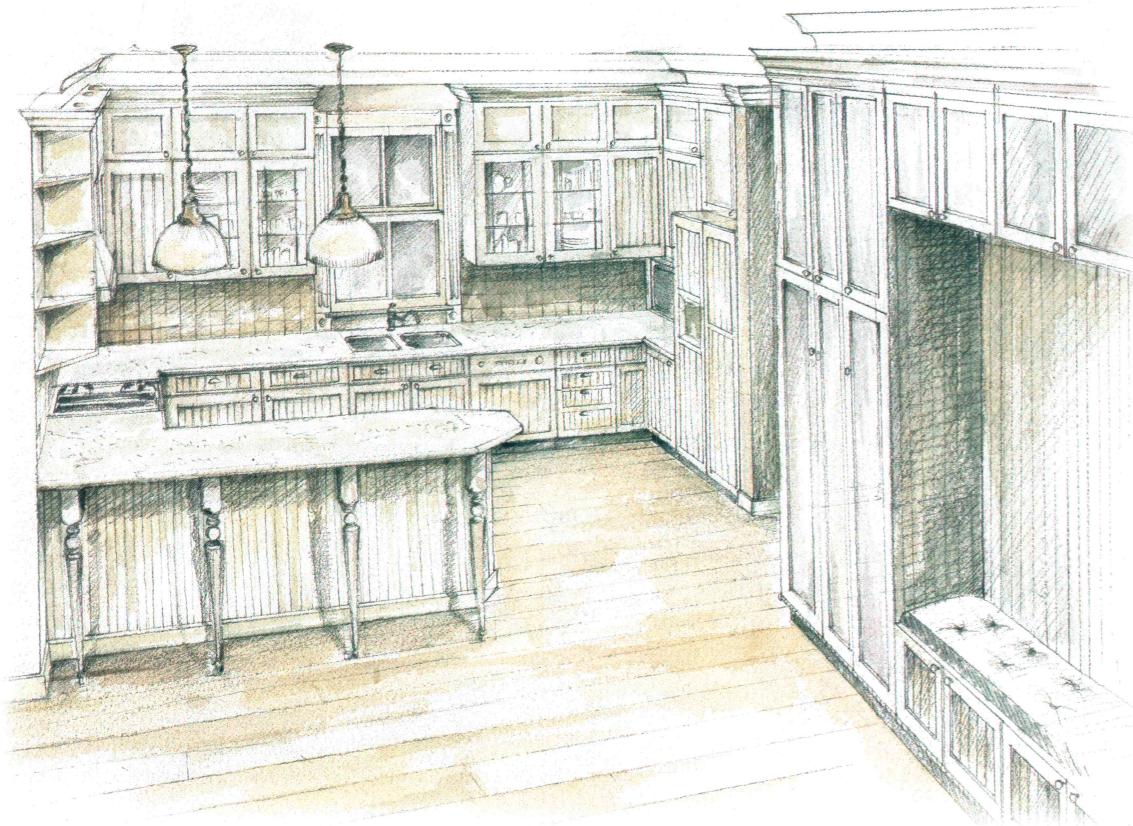
These schoolhouse lights were a favorite of Jock's, but Kathy was less impressed.



Kathy thought an old-fashioned faucet and a stainless-steel sink like these would look great in her kitchen.



final design



Kathy and Jock had the same revelation after visiting each other's kitchens: They weren't that far apart. With the help of kitchen designer Gina MacVicar, they soon finished the plan.

The refrigerator will be at one end of the C-shaped run of cabinets, the propane-fueled, stainless-steel range at the other. The sink will be between them, beneath the double-hung window. The dishwasher will be next to the sink and clad, like the refrigerator, with wood panels to match the cabinetry.

Kathy had wanted double wall ovens but there wasn't enough space, so Jock put a stainless-steel oven in the peninsula. Kathy will get the paneled hood she wanted, but it will house lights instead of a fan. (The range has a downdraft exhaust.)

As in Jock's favorite kitchen, the wall cabinets will be topped by a row of short cupboards with plain-panel doors. The rest of the off-white cabinetry, including the tall pantry cabinets in the mudroom and cabinetry used for the entertainment center in the family room, will have the bead-board panel doors Kathy chose on Martha's Vineyard. Because there is only one window in the kitchen, Jock chose glass doors for

the cabinets that flank it. The tin ceiling will be faired into the cabinets with high crown molding also made of tin. Where the molding meets the cabinets, wood rope trim will cover the seam. Turned posts that resemble table legs will support the peninsula breakfast bar. The back of the peninsula and the mudroom seating area will be paneled in more bead board, which will help unite the area with the family room. The honey-colored oak floors will add warmth to the off-white color scheme, and will match the flooring in adjacent rooms.

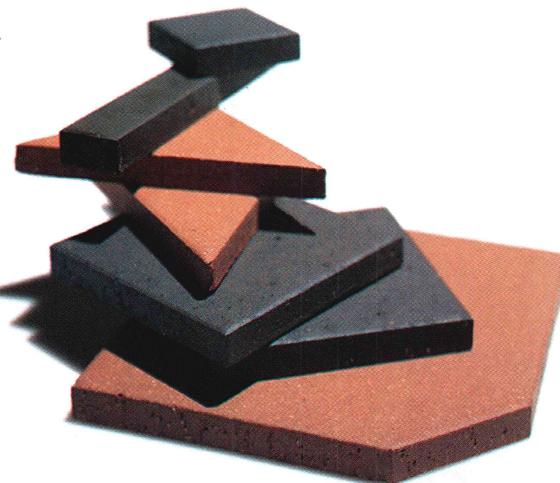
In the end, Kathy got what she wanted most, a stylish kitchen where she could do some serious cooking.

ILLUSTRATION BY DANIELLE HURLBURT



sum of its parts

Perhaps the hardest part of designing a kitchen is making choices—too many choices, Jock said. “It makes you long for the days when appliances came in one color and instead of cabinets, people put food and dishes on open shelves.” The choices for this kitchen include, clockwise from top left, cabinets with bead-board panel doors, brass pendant lights that will be suspended over the peninsula, a white, embossed tin ceiling (shown unpainted), a Welsh quarry-tile entryway for the mudroom, a stainless-steel double-bowl sink, brass cup pulls, brass knobs and pale gray granite counters.



PHOTOGRAPHS BY DARRIN HADDAD



♦ See Directory, on page 145, for details and sources



an
american
craftsman

derek ogden

Tilting at Water Mills

BY WALT HARRINGTON

Think of a clockmaker perched inside the works of a giant antique clock with gargantuan mechanical wheels and shafts, cogs and cans, gudgeons and gears, cranking and creaking and trembling. Derek Ogden is just now climbing inside such a machine, a water mill built in 1782 for grinding corn and wheat into meal and flour.

At first glance, you wouldn't think of the Burwell-Morgan Mill as a machine. You'd think of it as a quaint limestone and clapboard building that stands along the banks of Spout Run in



This complex arrangement of wooden gears drives Burwell-Morgan's millstones. At far right is the mill's pit wheel, the 12-foot-diameter gear that is driven directly by the center shaft of the waterwheel. The pit wheel drives the wallower gear, which drives the little cog wheel, which drives a gear that turns the millstones.

Millwood, Virginia, a burg of a few houses and a general store in the Shenandoah Valley, 50 miles west of Washington, D.C.

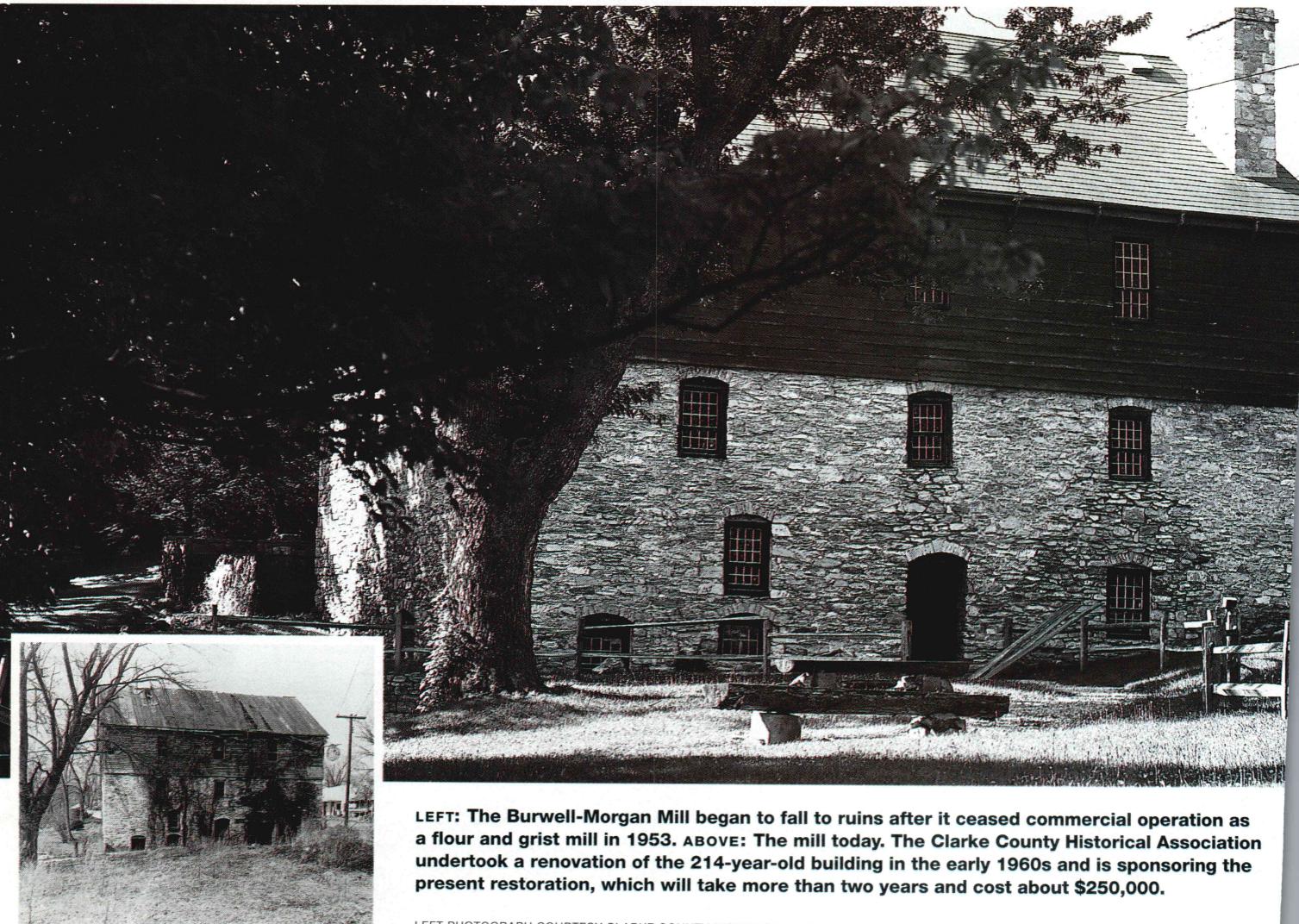
"People always regard a mill as another building," says Ogden, a thin, taut man in worn pants and shirt, with wiry gray hair parted on the left and jutting out stiffly to the right. He clasps his bifocals tightly in his right hand. At 65, Ogden is one of the world's preeminent millwrights. "A mill is not a building," he says. "A mill is a machine with a cover over it." With that, he scrambles across a railing and onto the framing of the new sluiceway he is building. In millwright parlance, it's known as the forebay or, as Ogden prefers, the flume.

It's a 24-foot-long, four-ton canal of white oak, 42 inches wide and 24 inches high. When the mill is up and running, this flume carries three tons of water from the outside millrace to the top of the 20-foot-diameter wooden waterwheel. With the muscle of gravity and weight, the wheel turns and churns out 15 horsepower, which travels through a sequence of axles, monster wooden gears and spindles to turn two grinding stones that are adjusted to rotate one ten-thousandth of an inch above two stationary bed stones. The friction of the stones transforms grain into sustenance. Stone-grinding water mills based on the principles used at Burwell-Morgan date back 3,000 years.

"There must be easier ways to make a living," Ogden says from his perch on the framing as he motions for the first of many 1½-by-10-inch oak planks that will today become the floor of the new flume. "Let's see," he says, stroking his chin, pondering. "You think she'll fit?" asks H. Baker, 56, a retired army colonel who has volunteered to help. Ogden flashes a wry smile and says, "Oh, yes. No doubt."

Derek Ogden first became fascinated with mills as a 15-year-old. He'd taken a trip from his home near Stratford-upon-Avon in England to the Netherlands, where he saw the world famous windmills at Kinderdijk. "I wanted to know what made them tick," he says. After earning an engineering degree, young Ogden began to work with Rex Wailes, a legendary British millwright. Over the years, Ogden repaired and restored scores of British mills, including the historic Chesterton Windmill at Warwickshire, built in 1632. In 1975, he took a commission in Virginia to build the state's Flowerdew Post Windmill, commemorating the 1619 construction of the first English windmill built in North America.

Ogden and his wife never went back to England. They think of the States as home now. Besides, there are a lot of mills here that need work. In his adopted country, Ogden has repaired



LEFT: The Burwell-Morgan Mill began to fall to ruins after it ceased commercial operation as a flour and grist mill in 1953. **ABOVE:** The mill today. The Clarke County Historical Association undertook a renovation of the 214-year-old building in the early 1960s and is sponsoring the present restoration, which will take more than two years and cost about \$250,000.

dozens, including the Lee Mill at Robert E. Lee's estate in Stratford, Virginia, and George Washington's mill at Mount Vernon.

"Do you see the pencil?" Ogden asks, searching around inside the flume. He's sitting on the first row of installed boards, his head and shoulders tucked down beneath the ceiling, a single workman's lamp illuminating his face. Ogden cut and lettered all the boards back in his shop near Madison, Virginia. He did his technical drawings and sketched the flume on a piece of notebook paper, which he keeps pulling out of his shirt pocket and consulting.

"All right," he says, folding and returning the sketch to his pocket. "Give me J." Soon, an oak plank about 10 feet long and weighing perhaps 60 pounds is passed through the flume's framework. Like all the floor boards, it has been cut to length and planed to width. Its edges have been grooved to hold a $\frac{1}{8}$ -inch oak spline that will tongue the boards together tightly but also leave enough space between each so the floor can expand a total of half an inch along its four rows.

"What I really enjoy," Ogden says of this job, "is that I can meet the original millwright. I never see him, but I know exactly what he was like by how he did his work." Ogden believes he comes to know what kind of man that long-dead craftsman was by how closely he cut his mortises to his pencil markings, how expertly he used his chisels, how tightly he fashioned his joints. From such clues, he discerns the man's character, because a man's knowledge and dogged exactitude—his level of excellence—is how Ogden judges character.

Ogden has worked with helpers who will mark their cut lines on a board and then saw the board a good sixteenth of an inch off the mark. He simply cannot understand how the minds of such people work. It's no more difficult to saw on the line than to miss it. His attitude, by modern standards, is downright old world: "Any job done well, no matter how humble, is noble." Patience and perfection equal achievement, which produces in people a joy that is loosely described as pride. So why not do it right?

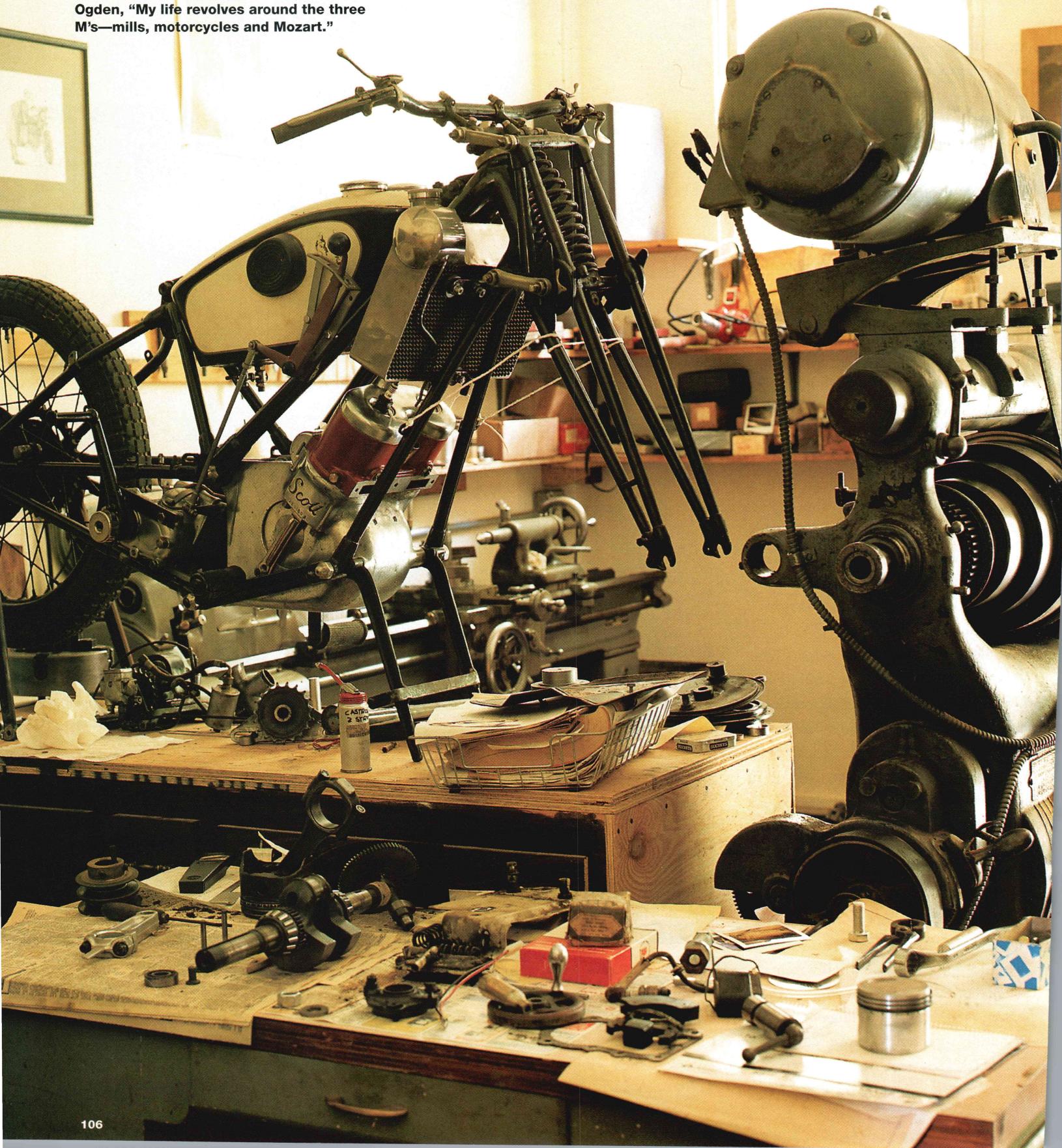
In meeting the original millwrights, Ogden has come across wooden joints so tight they haven't vibrated loose in 200 years. "They did it all by hand—the care they took, how accurate they were with a chisel." These are men Ogden would like to know in person, men who could judge his work. Today, very few people know enough to judge his work. He is among the last of a species.

In mills repaired by supposedly competent millwrights, Ogden has seen joints so poorly made they've wobbled loose in a few years. He's seen new, tight gears made of green oak, which will inevitably shrink and loosen when the wood dries. Ogden once



Ogden dresses one of Burwell-Morgan's buhrstones, an exacting process of carefully chiseling patterned furrows into the stationary stone. As the "runner" stone above it turns slowly, the long, medium and short furrows—called the master, journeyman and apprentice—spread the grain from the center of the stone to the edges, where the grinding takes place.

The skeleton of a 1930 Scott motorcycle has been sitting on Ogden's workbench for a year, waiting for him to have enough time to make the unobtainable parts for its restoration. He'll form new gears on the circa-1900 Hendey-Norton milling machine at right. Ogden's collection of 30 vintage motorcycles includes the 1928 Douglas that Sprouts Elder rode to a world dirt-track championship. Says Ogden, "My life revolves around the three M's—mills, motorcycles and Mozart."





Although Ogden's strong hands are gnarled from decades of grasping massive logs and beams and swinging huge hammers at wooden pegs, they also chisel precise joints that fit together as tightly as a furniture maker's dovetails and resist constant vibration for 100 years.

knew a sawmill owner who could tell the tightness and strength of a tree's internal grain by studying the texture of its bark. "That's an art that's gone completely," he says sadly.

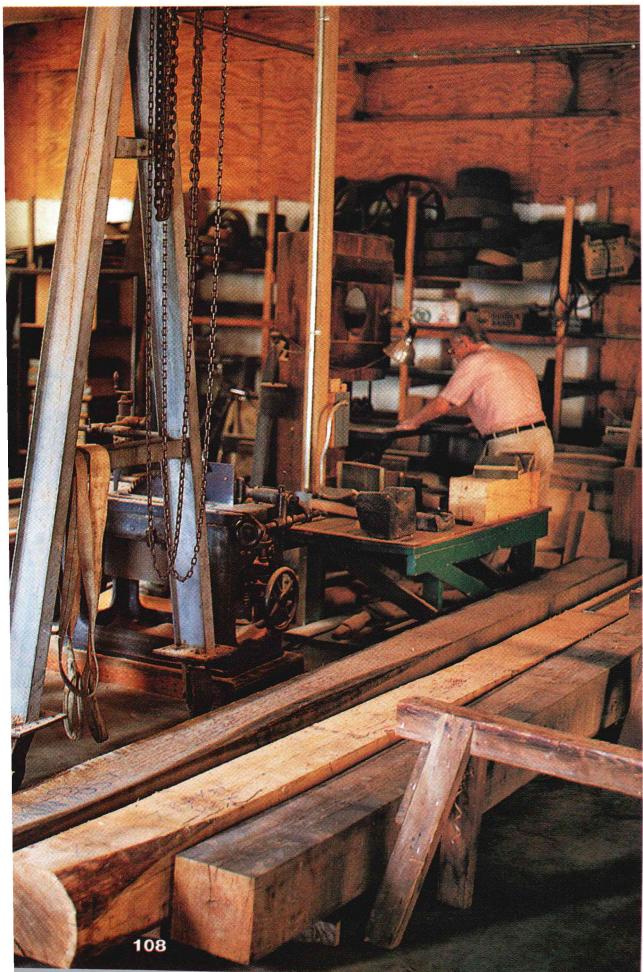
At the Burwell-Morgan Mill, Ogden is denied the chance to meet the original builder. The mill was restored 30 years ago by well-meaning folks who saved the structure but little of the spirit of the original millwright's work. The machine has a long list of flaws. The flume Ogden is replacing was rebuilt in pine instead of white oak. It leaked and rotted so badly it had to be lined with fiber-glass. The spout that pours water from the flume into the buckets of the waterwheel delivers its load at 12 o'clock on the wheel rather than at the correct 11 o'clock position. The headgate that controls the flow into the flume from Spout Run is made of 20th-century metal instead of 18th-century oak. The wheel's oak axle, or shaft, is too small for the 20-foot wheel. The wheel itself is made of mahogany, a strong, water-resistant wood that was unavailable in 18th-century Virginia. The original wheel was surely white oak.

The waterwheel's spokes—its arms—are mortised and tenoned only a few inches into the wheel's shaft. They should extend all the way through in what's called a compass-arm fixing that interlocks in a notch joint, like the pieces of a three-dimensional wooden puzzle. In well-built mills, the moving millstones and gears aren't connected to the walls, floors or ceiling because the constant vibration will eventually cause the building to collapse, which is what happened to the Burwell-Morgan Mill in 1943. Today, the mill's moving parts are correctly attached to what's called the hurst frame, a giant stand-alone table to which the stones and gears are secured. But this hurst



ABOVE: The circa-1920 Woden band saw in Ogden's workshop. He bought the antique machine a quarter-century ago in England for £5.

BETWEEN: Sixteen-foot beams will replace rotted wood in Burwell-Morgan's hurst frame, the giant table that holds all the mill's moving parts.



frame is far too tall, making it unstable. And those are just the big flaws. The good news is that the 2,000-pound, 100-year-old French buhrstones that mill the grain are in good shape, although their bearings need lubrication.

"People haven't paid enough attention to detail," Ogden says of the mills he has repaired over the years. And they've got the wrong idea. They focus on saving mills instead of preserving and passing on the millwright's knowledge. Without those skills, he says, in 50 years no properly operating mill will be left in America.

From inside the flume, hammers begin clamoring, and their sound bounces painfully off bare wood and hard stone. Ogden, Baker and two more volunteers, John Lincoln, 61, and Joe Guenther, 59, are all swinging away. They've laid three rows of planks and splines and must now pound wedges between the supporting frame and the third row of boards to raise the edge at about a five-degree angle. Only then is there room in the walled trough to tap the final row of grooved planks onto the protruding splines. Then they must knock out the supporting wedges so the interlocked floor can fall into place flush against both side walls, creating a watertight channel when the wood swells. Ogden stops hammering, glances around in the flume, wipes sweat from his face and stretches his legs.

"I need a pencil. And a pair of younger knees."

When the flume is done, Ogden will move on and repair the hurst frame for the next few months. Then he'll lug seven tons of oak planks and a giant three-foot-diameter oak log into the workshop in the woods behind his house and begin building Burwell-Morgan's new 20-foot waterwheel. Although Ogden likes to rebuild old motorcycles for relaxation, this winter he'll pass up restoration of the 1930 Scott that stands half-finished atop a bench in his workshop. That would divert his attention from the wheel.

Instead he'll work alone for 12 or more hours a day, every day but Sunday. He'll use the dozens of gleaming tools that hang over the massive carpenter's bench he brought from England: the 100-year-old walnut-handled chisel that was his grandfather's, the engineer's square that his father bought in 1926. He'll move seemingly unmovable objects by himself on dollies or with a portable two-story crane. He'll stop occasionally and glance at the photograph of civil engineer Isambard Kingdom Brunel standing before the giant launching chains of the steamship *Great Eastern* in 1858. "He's my hero. The greatest engineer who ever lived, an absolute genius. He built tunnels, railroads, bridges, ships. He died at age 53 from overwork."

The Burwell-Morgan waterwheel will have 60 buckets configured as they were in 1782. The wheel's shaft will be 24 feet long, 28 inches across, made from a log that has been drying for two years. With two motors driving his six-foot chain saw, Ogden will carve 12 sides into the log. Then he'll fine-sculpt it with two ancient millwrighting tools, a razor-sharp Kent broadax and an adze. All the pieces will be held together with wooden pegs or metal nuts and bolts that Ogden will fashion in his own metal shop.

The waterwheel will be spoked with three 20-foot beams that pass through the center shaft in the compass-arm technique. To interlock them, Ogden will saw and chisel a combination of 30- and 60-degree angle cuts in the arms—four cuts in the first, six in the next, six in the last. At the Burwell-Morgan Mill, he'll slide them all into a gaping hole sawed in the shaft's center, lock them together and then tightly wedge the gap closed. "I get a great deal of satisfaction from it. When I put that joint together at the mill, I know it's going to be perfect."

And that, finally, is the kick. Ogden once constructed a giant wooden swivel

cap for the Danish Windmill in Elk Horn, Iowa. He built the whole contraption in his shop, remachining the original 1824 cast-iron bearings upon which it would turn like a weather vane atop the 50-foot-high mill tower. He loaded it on a flatbed truck and shipped it out. As a crane lowered the cap into position, someone in the gawking crowd asked, "You think it will fit?"

"Of course it will fit," Ogden answered.

"And it did, perfectly. I knew it would. I just looked at everybody else. Big smiles on everybody's faces and everybody shaking hands. It was like magic to them."

They were astounded, awed. Ogden can think of only one comparison: Whenever he listens to Mozart's Clarinet Concerto K. 622, he feels an infinite sense of awe at its perfection. Always, chills run up his spine. "Brunel was the greatest engineer and Mozart was the greatest composer. I cannot believe that somebody could have

written music as beautiful as that." When he finishes a project, Ogden believes he feels a trace of what Mozart must have felt when he finished one of his works. How many people ever do anything that approaches perfection? How many ever feel that absolute joy? Ogden wonders why anyone would want to live without experiencing it.

In two years, when he has finished the Burwell-Morgan Mill, Ogden will again feel that joy. "They are all going to be standing there thinking, 'I wonder if it's gonna work?'

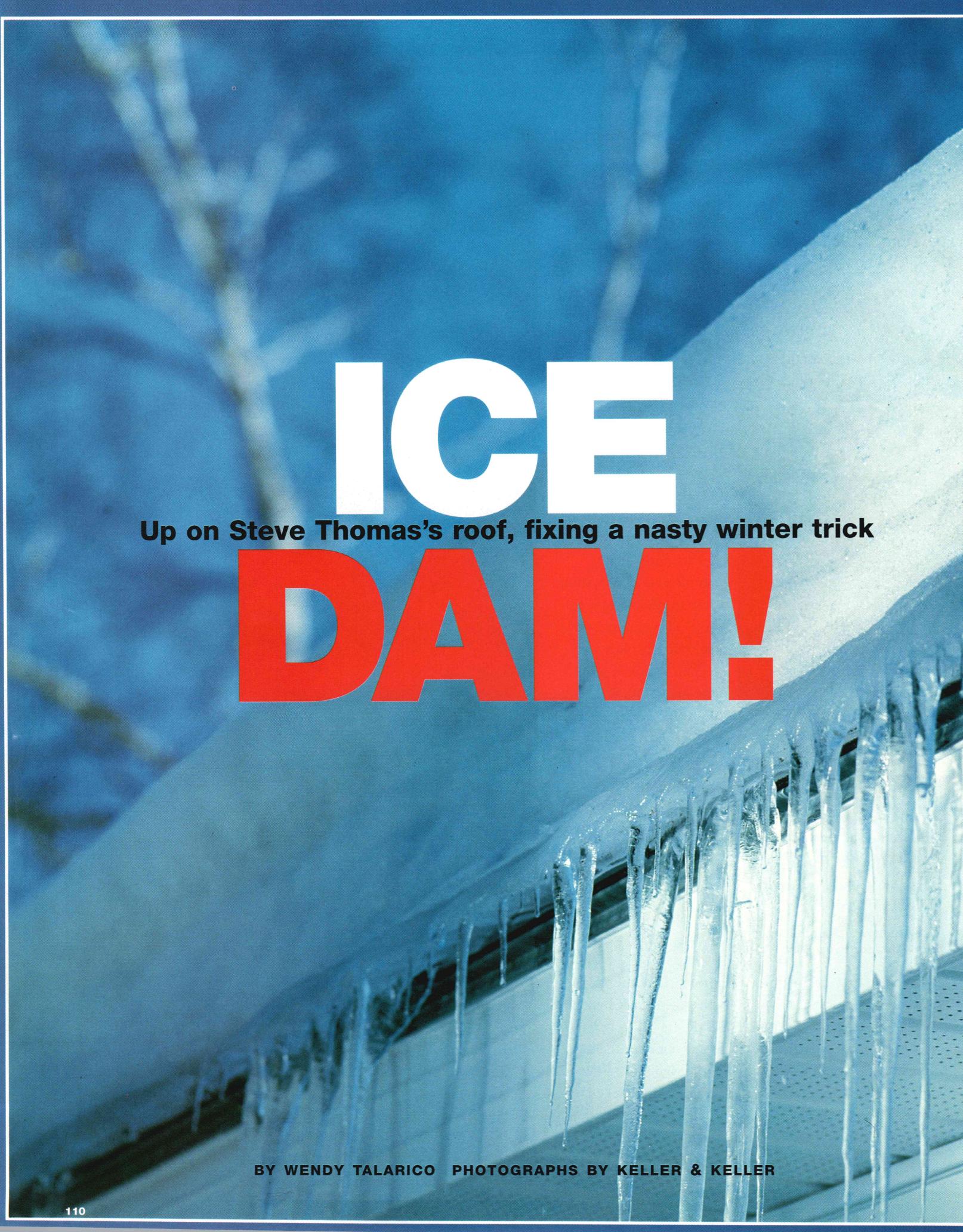
"And I know it will work."

ABOVE: The old waterwheel shaft, removed from the mill 30 years ago. **RIGHT:** Ogden examines the 3-foot-diameter white-oak log from which he will carve the mill's new waterwheel shaft. The log has been mellowing outside his workshop for two years.

The last row of the flume's floor is finally splined in place and held up in the air in its five-degree tilt by the wedges beneath it. "Everybody off the flume," Ogden says, as he climbs over its edge, hangs out over the 20-foot fall and, starting with the middle wedges to limit stress on the far ends of the splines, hammers them out as Baker, Lincoln and Guenther stand on thehurst frame and watch. The floor falls into place of its own weight, like a ship being cast off from dry dock. When the headgate is eventually opened, the flume will leak water for about a week while the oak swells. Then it will stop leaking for about, oh, 25 years, when it will have to be replaced again, if the history is to stay alive.

"Perfect," Ogden says of his day's work. "It's quitting time."



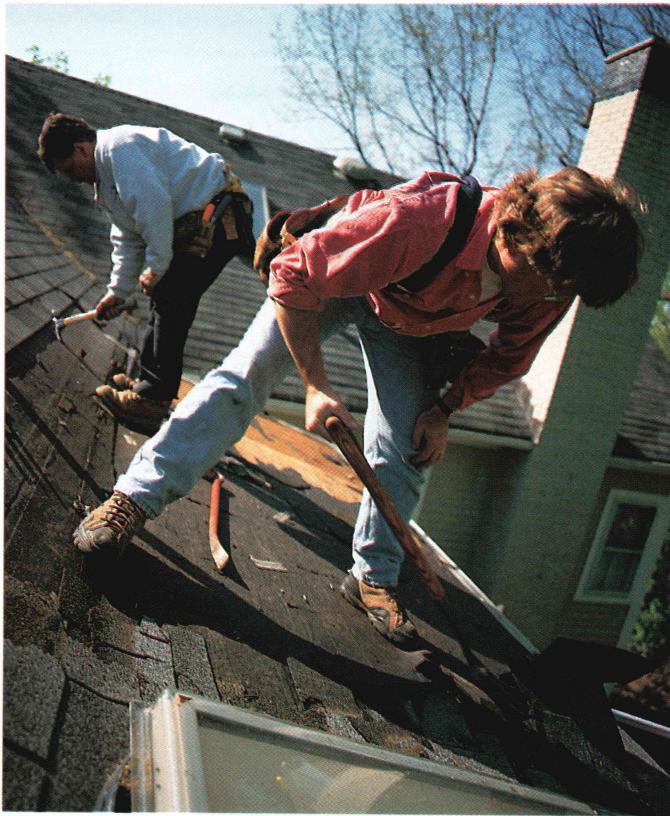


ICE

Up on Steve Thomas's roof, fixing a nasty winter trick

DAM!

BY WENDY TALARICO PHOTOGRAPHS BY KELLER & KELLER

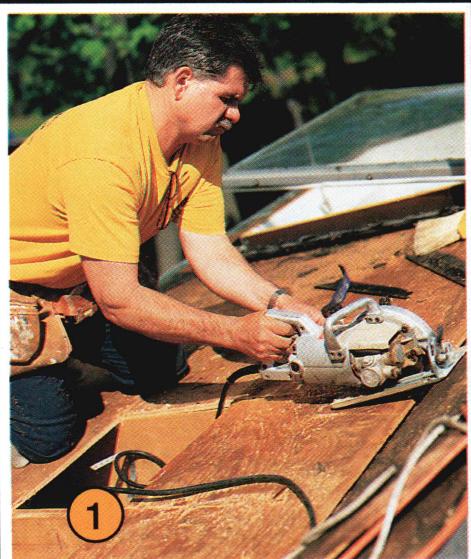


Tom Silva and Steve Thomas started by stripping off the shingles and roofing felt. They also removed the gutter so it wouldn't be damaged during the project.

There's not much room to work on the narrow patch

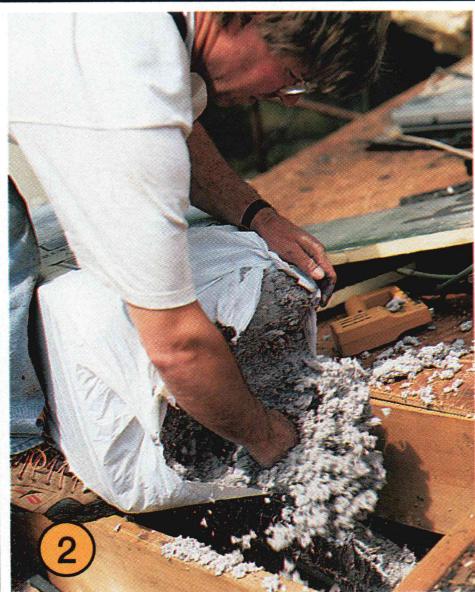
Last winter, "the icicles were this big," says Steve, throwing his arms wide open. The icicles hung from the eaves on his back roof, threatening to impale anyone who dared pass beneath them, but they also signaled another menace: ice dams. At Steve's house, infiltrating water wrecked plaster and left indelible white spots on wood floors in one of the bedrooms.

of roof over the back of Steve Thomas's house. To avoid a mishap, Steve and *This Old House* contractor Tom Silva step carefully around each other, the tools in their belts sometimes colliding and jangling. Plagued last winter by ice dams that damaged walls and floors, Steve is eager to fix his



1

With the plywood sheathing exposed, Tom cut away portions to uncover trouble spots. Steve knew the flashing around the skylight leaked heat, but opening up the roof revealed more problems. Excessive amounts of heat also were escaping through recessed lights, a vent pipe and inadequate insulation.



2

Where insulation was scant, Steve and Tom filled the rafter bays with cellulose. Installing cardboard baffles over cellulose or loose-fill fiberglass maintains the ventilation path and prevents the insulation from drifting when air blows through.



3

Installing the self-adhering membrane was "a little like tangling with a giant roll of flypaper," says Tom. Two courses of this waterproof layer were laid in a 6-foot-wide strip along the eaves to protect the house from water that backs up behind an ice dam.

roof before the blizzards begin again. He's also eager to pick up some tools and tackle a project, having done his share of renovating over the years.

"Nice to be doing some real work," he says with obvious enjoyment as he strips off shingles with his hammer claw.

"That's because you don't do it every day," Tom shoots back as he removes a few feet of gutter. The morning is mild, but with rain in the forecast, there's a sense of urgency about getting the job done as soon as possible.

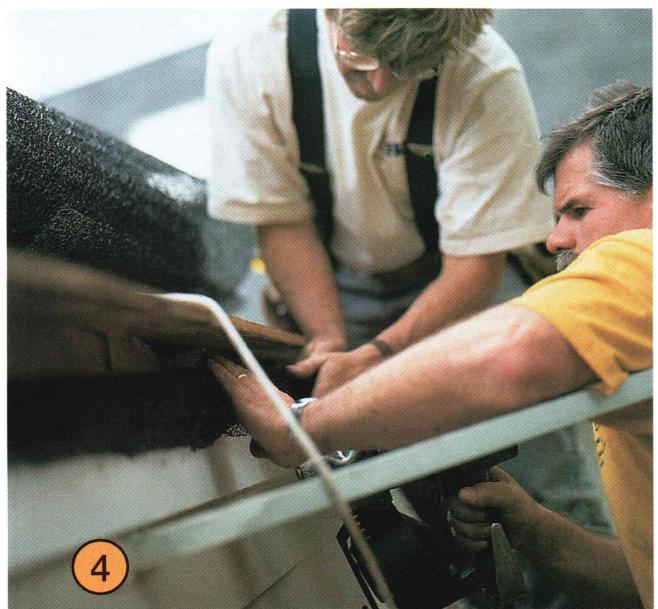
"Here's part of the problem," Tom says after cutting out a square of plywood sheathing. He has uncovered two recessed lights in the ceiling just below. "Talk about heat loss," he adds. Unlike the sealed can lights made today, these can't be covered with batt or loose-fill insulation. Not only are they an easy escape route for room heat, but with the bulbs just inches from the roof, they're also a snow-melting hot spot. Tom and Steve edge past the hole to collect some sheet metal and rigid foam insulation to make airtight caps over the lights. It'll be the first of several fixes.

Ice dams are an exasperating trick of nature and architecture. They form when warm air, escaping from a house through vent

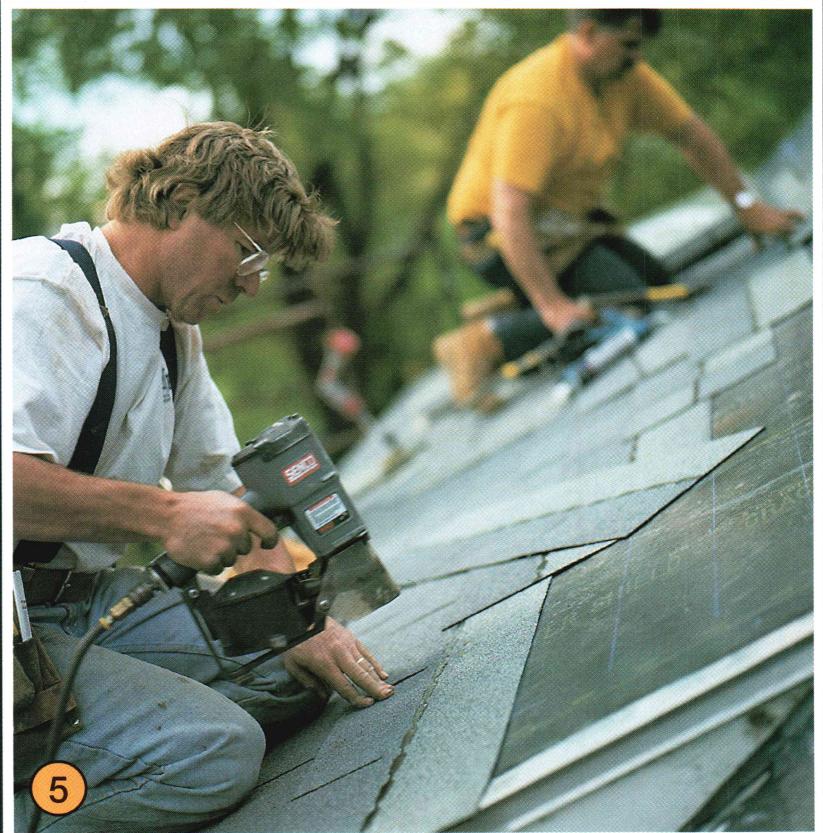
pipes, a poorly insulated attic, recessed lights or any other heat leak, melts snow on the roof. Water trickles down the shingles only to refreeze at the cold eaves, which have no building heat beneath them. As layers of ice accumulate, they form a ridge—the dam—that blocks the flow of further snowmelt, forcing water to pool and back up under the shingles.

When conditions are right—a constant, deep blanket of snow, a string of sunny days and frigid nights—ice dams are all but inevitable. Along with the heat leaks, other contributors to the problem include clogged gutters and badly designed roofs, especially those with shallow pitches. If the backed-up water penetrates the roof's tar paper and sheathing, it can flow surreptitiously along rafters and down into wall cavities, soak and ruin plaster and even stream out of walls and ceilings.

Outside, gutters that fill with ice can bend, break and fall off. It might even seem as if gutters were as much to blame for the formation of ice dams as heat loss, but their role is more of a supporting one. "Gutters just add to the problem," Tom says, "they don't cause it, and taking them down would only cause other problems." Exposed as they are, gutters get even colder than the eaves they hang from, often causing water and snow to



To improve roof ventilation, Tom and Steve created an intake vent by cutting slots into the top edge of the fascia board behind the gutter. Then they put up two strips of a plastic mesh and nailed the original crown molding over it. The increased ventilation will keep the roof surface colder, helping to prevent the snowpack from melting.



New shingles finish the roof and protect the waterproof membrane from the effects of sunlight. Nailing through the membrane wasn't a problem because the rubbery material is self-sealing.

turn to ice that remains until the next thaw. Eventually, ice from the dam and the gutter can become one big hunk.

"The only way to prevent it is with heat cable in the gutter and downspouts," Tom says, "but that's really just a Band-Aid and doesn't fix the problem." Using a snow rake to keep the roof clear can help forestall both damming and gutter woes, but it's not a permanent solution either nor is it always successful. On roofs where snow has been raked from the lower part of a pitch ice dams can form higher up. The only real fix, Tom says, is to block the heat loss and get the roof cold.

Like many old buildings, Steve's 1836 home consists of a main dwelling with numerous scabbed-on additions. The roof that suffered from last winter's dams lies over a two-story addition from the early 1900s.

"Your insulation is really thin over here," Tom says, looking down into a rafter bay with a scant three inches of loose-fill cellulose. Where Steve lives, just north of Boston, there should be at least 10 inches.

To make up the difference, Steve and Tom shake more cellulose into the rafter bays; bits of it fly about, clinging to clothes and tools like dingy snowflakes. Then they level it off and leave

two inches open at the top of the bay so outside air can flow in through vents and along the underside of the roof to keep it as cold as possible. With heat leaks plugged and insulation brought up to snuff, the next step is to improve ventilation in the roof. Soffit and ridge vents are the common solution, but getting more air into Steve's roof is going to take some doing.

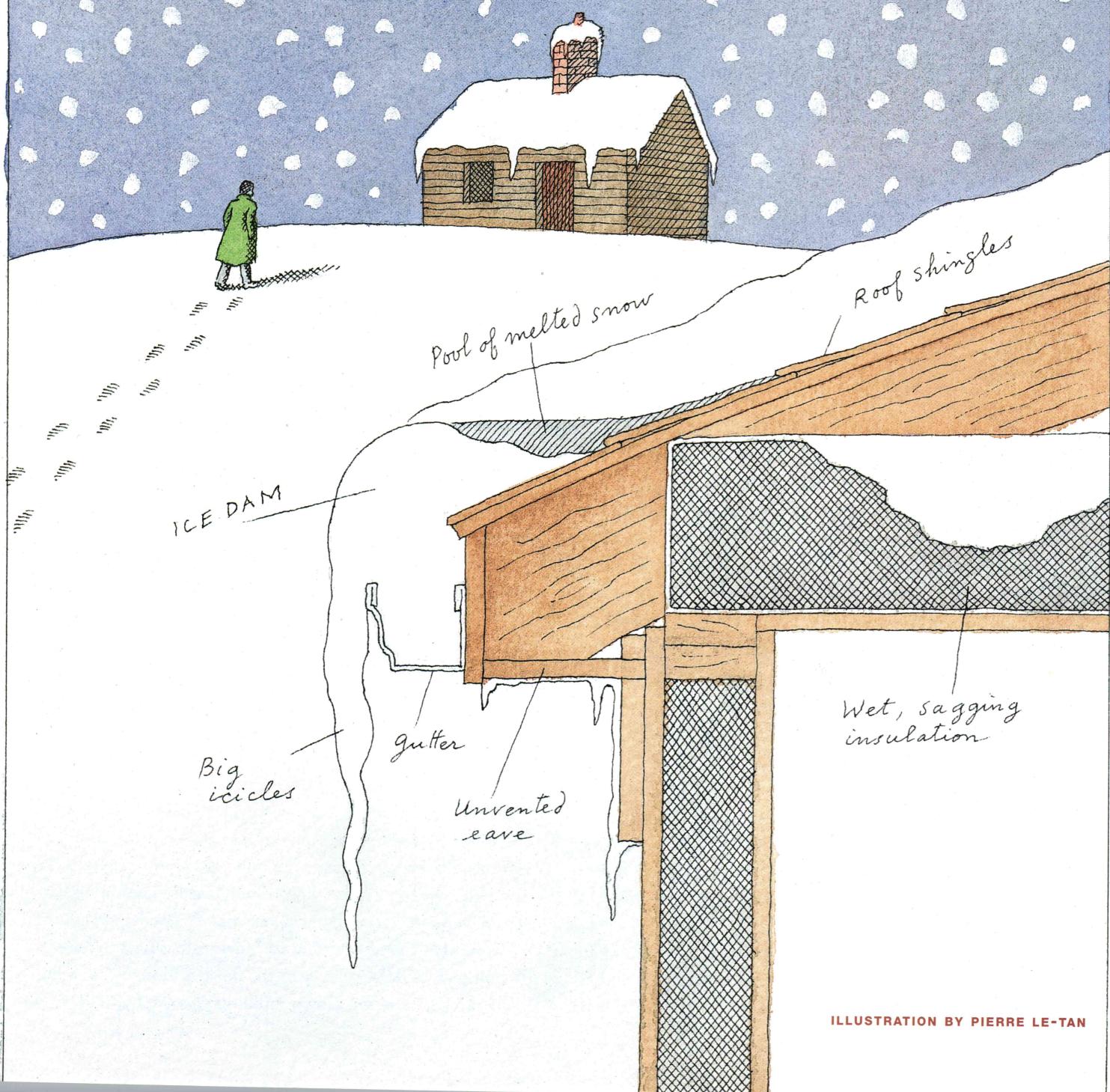
"You've got a vent in the main part of the roof, so we need to open this pitch up to it," Tom says, pulling a pencil from his tool belt and sketching a plan on the exposed plywood. "We can notch this beam," he says, referring to a 2x12 that separates the two pitches, "but we need a way to get air into the soffit." As with many houses, there isn't enough space under the eave to add a soffit vent.

"Why don't we put that plastic mesh behind the crown molding?" asks Steve, taking out his own pencil to draw an eave detail. The mesh he has in mind is a fibrous material that's normally used as a spacer to promote air circulation under wood shingles, hence the product's name: "Cedar Breather."

Tom likes the idea and draws furiously on his plywood sketch pad. A double layer of the mesh will maintain a half-inch gap between the crown molding and the fascia, feeding

WHAT THE DAM DOES

The damage begins when ice builds up high enough to trap water, which then backs up under shingles. When it leaks into a ceiling or wall, the water can soak and depress insulation, rendering it all but useless. Excessive moisture in walls can also cause blistering on painted siding. When water soaks into plaster or drywall, it can leave stains or even send pieces crashing to the floor. A gutter that collects ice, as often happens, can bend, break or even be forced off the eave.



air to the rafter bays through slots cut into the fascia. (Another way to create the gap is with spacer blocks nailed to the fascia and covered with insect screen. The crown molding is nailed to the blocks.) The mesh idea looks good, so Tom gives Steve a nod, and they get back to work.

With preventive measures in place—caps over the lights, beefed up insulation and better venting—Steve and Tom decide to improve the roof's ability to fend off a leak in case a dam does form. "Even a well-designed roof can get a dam," Steve says. "For example, with enough snow, the roof vents can be blocked."

After replacing the sections of plywood sheathing they cut out, Tom and Steve roll out two courses of a thin, 39-inch-wide waterproof membrane along the edge of the roof and cover it with shingles. Made of polyethylene and rubberized asphalt, the membrane is the last line of defense if an ice dam forms and water gets in under the shingles. Because the material is self-sealing, shingle nails won't be leak points, which makes the membrane better than common tar paper. It'll take one tall dam to push water six feet up the roof and defeat the membrane.

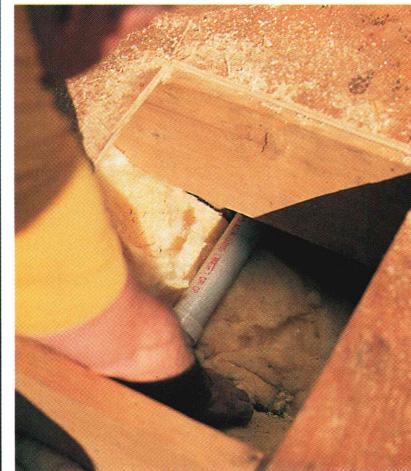
Other measures, such as running heat cable to melt drainage channels into the dam or adding an apron of slippery metal roofing to prevent snow from accumulating, can help minimize or eliminate ice dams. But the waterproof membrane, Steve and Tom agree, is the most reliable solution and, because it's hidden by shingles, the best looking.

If the worst happens and water enters the house, there are ways to stem the flow. Hacking drainage channels into the dam with an axe is one way, though not recommended because it's clearly perilous up on a frozen roof, and chances are good that axe blows will cut the shingles. Tom's quick-fix solution is to set up window fans next to gable vents or near soffit vents to blow cold outside air into the attic. This can quickly lower the temperature in the attic, make the roof colder and refreeze the snowmelt. In most cases, Tom says, the flow of water stops within minutes.

By late afternoon, the men have nailed fresh shingles in place and rehung the gutters. The job done, they gather their tools and start taking down the scaffolding. It's been a long day working on a sloped surface, and Steve is feeling it. He rubs his shoulders and makes circles with his aching arms. He squints up at the sky, where, as if on cue, clouds have moved in. Not the white puffs of summer but dark, tumultuous clouds, the kind that say winter isn't too far off.

IN SEARCH OF HEAT LEAKS THAT FEED ICE DAMS

Tom Silva recommends examining a roof after a heavy frost to see where the ice melts first. Along with thwarting the dam, he says, plugging leaks also cuts heating costs.



PLUMBING VENTS

An uninsulated plumbing vent introduces both heat and moisture to an attic. Tom wrapped this vent pipe in foil-faced insulation and then covered it with loose-fill cellulose. He sealed cracks left where the pipe passes through the ceiling with silicone caulk.

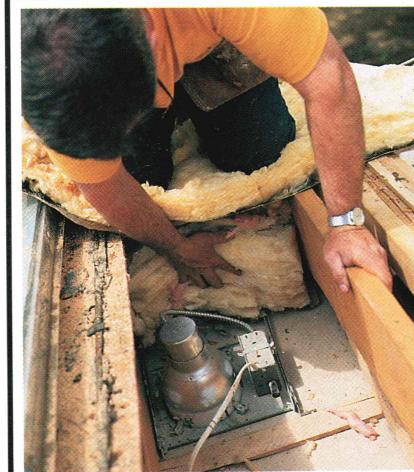
SKYLIGHTS

A poorly installed skylight causes never-ending problems. If air from the house reaches the underside of the flashing, it can melt any snow above. The solution: Find gaps in the framing around the skylight and fill them with expanding urethane foam sealant.



LIGHTS

While recessed lights in tightly sealed cases are available now, Steve's old lights had air gaps. To close them, Tom made caps of sheet metal and rigid foam insulation and carefully sealed the seams with silicone caulk. For fire safety, they were sized to leave three inches of clearance between the caps and the light fixtures.



the peril of

Sooner or later, your buried heating-oil tank is bound to leak. Fixing it could bankrupt you—unless you know what some cleanup companies won't tell you

We listed our house, a pretty Colonial on a kid-packed suburban New Jersey street, a year ago August. My husband and I had a contract to purchase a bigger house nearby, and we were delighted to find buyers for our old home six weeks after listing it.

The buyers qualified for a mortgage. We fixed the front steps. Everything was going smoothly. During the inspection, the buyers asked whether there had ever been an underground oil tank. Yes, we said, the owners before us had converted from oil to gas heat. They had decommissioned the tank in 1990, a year before we bought the house. The tank was still under the driveway. We had a notice saying the town had inspected the work.

Take out the tank, the buyers said, or we're not buying. We said no. We'd heard enough oil-tank horror stories to keep us from wanting to know what was down there. Our agent was certain we would lose the sale. We told her we were willing to take that chance. But that night at our dining room table, we wrestled with the consequences. My husband didn't want to dig up the tank. He thought the buyers wouldn't pull out. I was afraid we'd lose the other house and thought we should yank the tank. We talked to people who'd done it. None had encountered a leak. We also talked to a neighbor, a licensed home inspector, who'd had his own tank removed without problems and doubted we would run into trouble. I argued that since our soil was probably similar, we were unlikely to have a leak either.

Then the owner of the real-estate firm called. Take out the tank, he said. What'll it cost you? Less than a grand? Besides, it's the only way you'll sell the house. We gave in.

I was at work the day the backhoe hoisted the 550-gallon tank. My husband, Mitch, came home from the office to watch. We have a problem, he told me over the phone. I felt a pain in my stomach.

The removal of the tank did cost less than a thousand dollars. But it was immediately obvious on that November day that the tank had leaked and that there would be other costs—potentially huge costs. I never saw the tank, but my husband said water poured through half a dozen dime-size holes as it was lifted. A puddle of water down in the pit had an oily sheen, and the air smelled like fuel.

The contamination was so obvious, no soil tests were needed. That day the town inspector reported our spill to the New Jersey Department of Environmental Protection. Within a week we received a letter from the agency informing us that it had opened a case file.



Doug Lawless, a technician for a New Jersey environmental cleanup company, shovels dirt from the fill and vent pipes of a tank in Clinton, New Jersey. Power equipment might break the pipes, allowing oil to spill.

Before the file was closed, a two-story pile of dirt would consume the front yard for five months, blocking the front door, and our sidewalk and front pathway would be destroyed. The total cost for restoring our property to normal: \$38,000. It was hardly comforting to learn that we were not alone, and sickening to discover that our nightmare didn't have to be so expensive. Had we known about the full range of cleanup options, we might have cut the bill in half.

Asbestos and radon have had their moments as homeowners' environmental albatrosses. Now it's underground oil tanks. And

tanks

By Patricia E. Berry
Photographs by Bernd Auers



ns of a carefully yanked
k: a gaping hole cut in
side allows remaining
to be sopped up and a
stic sheet catches drips.



just as reactions to those earlier threats were often exaggerated, scientists have discovered that buried oil tanks pose far less danger than once thought. Pulling tanks out of the ground and hauling away oily soil once seemed vital, and some still say it is. But the crusade to remove even the slightest trace of contamination could go down as one of history's most expensive examples of environmental overkill.

The earliest fears about underground storage tanks were over leaks at gas stations: Gasoline vapors spreading under adjacent neighborhoods seeped into houses and threatened water supplies. In the early 1980s, traces of industrial solvents from computer manufacturers' underground tanks were found in drinking-water wells in California's Silicon Valley. Fears were exacerbated when it was reported that the contamination might explain seemingly high numbers of miscarriages and babies born with defective hearts. The worry was that once toxic fluids got into the ground, ever-expanding "plumes," like buried clouds, would contaminate wells for miles around.

First in California, then elsewhere, laws were passed requiring that leaking tanks and all traces of contamination be removed. It

Wearing protective gear required by federal regulations, Bill Hines, a supervisor for a New Jersey cleanup company, bails out sludge from the bottom of a tank in Montclair, New Jersey.

didn't matter whether the tanks held solvents, gasoline or heating oil, or how much the cleanup might cost. In California alone, 28,000 leaking fuel tanks were found over 10 years, and \$3 billion was spent on cleanup. Yet only six of the state's 12,151 public drinking wells were contaminated by fuel from underground tanks. Replacing those wells with piped-in clean water would have been a thousand times cheaper.

Only recently have scientists at California's Lawrence Livermore National Laboratory and elsewhere discovered why leaking fuel oil did not result in an environmental disaster. Gasoline, and especially heating oil, do not behave like most solvents. Oil can travel only where there is enough of it to saturate the soil. Beyond that point, the oil breaks up into isolated globules that bond to the soil and generally do not move. In addition, when conditions are right, bacteria in the soil will feed on the spilled fuel, converting petroleum hydrocarbons into water, carbon dioxide and other harmless materials. The bacteria are especially effective at the oxygen-rich edges of the saturated area, helping to keep the plume from expanding. Over several years, bacteria can digest all the spilled fuel.

In light of this, regulatory agencies are beginning to ease up. The federal Environmental Protection Agency and some state agencies, including those in California and New Jersey, now evaluate spills by how much risk they pose to the surrounding environment. If oil isn't likely to pollute a well, emit vapors inside a building or harm nearby wildlife or vegetation, regulators sometimes require only that the leaking tank be hauled away. In 65 percent of the cases referred to New Jersey's Bureau of Underground Storage Tanks, once the leaking fuel source is removed, no further remedial action is necessary, says bureau chief Kevin Kratina.

However, sometimes naturally occurring bacteria need a boost. When the contaminated soil is exposed in the tank pit or dug out and piled next to it, cleanup companies can inoculate the soil with additional bacteria and add fertilizer to keep them healthy. In cold climates, heat also helps, but warming the soil usually isn't cost-effective.

Bioremediation—the technical term for environmental cleanups achieved by natural means—works for many oil leaks. But most cleanups still use more drastic, and expensive, measures. One reason is that bioremediation takes more time—one to three years, compared with a few days for excavation. If the cleanup is tied to the sale of the property, excavation may be the only practical option because the case file can be closed in 60 to 90 days. With small leaks, carting away contaminated soil may actually be the most economical solution. The cleanup company's risks are

lower and the paperwork and monitoring simpler. Stephen Fauer, president of Environmental Strategies and Applications, an environmental consulting firm in Somerset, New Jersey, says that even as more cleanup options become available, the traditional solution is becoming less costly. In New Jersey, Fauer can get rid of oily dirt for just \$50 a ton at a plant that recycles the material into asphalt paving. He used to spend \$120 a ton to leave it at a hazardous-waste dump outside the state.

Of course, cleanup companies with a vested interest in expensive jobs may never tell potential customers about all the options. Fauer says some companies press homeowners into believing that their only choice is to excavate and haul away the

contaminated soil. The point, he says, should be to clean out the soil, not the homeowners.

Our saga may be ending. The buyers hung in long past the contract date but eventually dropped out. In June, when the state finally closed our file, we began marketing the house ourselves. Soon, we hope to pass title to a new family.

Our expenses, including the cost of owning two homes for a year, will reach \$50,000 to \$60,000. We've applied for reimbursement from a New Jersey spill fund but have yet to hear back. In a way, we're lucky. Had the oil seeped into the groundwater beneath our property, the testing and cleanup costs would have multiplied. Groundwater remediation on residential properties often costs more than \$100,000.

We could have avoided the problem altogether by waiting for buyers who were willing to live with a decommissioned tank. Had we known five years ago

what we would be up against today, we would have hinged our purchase of the house on the previous owner's removal of the tank. But oil tanks weren't an issue in 1991. We have neighbors who bought a house as recently as three years ago and weren't advised by their attorney of the potential for a problem. Now, one lawyer I know says he and his colleagues consider themselves liable for malpractice if they don't inform their clients of the risks of having an oil tank on their land, particularly one that is underground.

Our property is clean now, and for that I suppose I should feel better than I do.

It troubles me that we might have been able to cut our costs significantly if we'd had more time or known enough to hire a consultant before the tank was removed. Our tank-removal company didn't set aside the uncontaminated soil above the leak, so some of the 185 tons hauled away from our property for \$70 a ton was perfectly clean.

Our new home is heated with oil. The tank is under our front yard, and we haven't had it tested because we don't want to deal with it. We have insurance through our oil company that is supposed to cover us for up to \$200,000 if the tank leaks. I am only somewhat reassured by this. As I've come to realize, steel-clad guarantees don't always mean much.



to test or not to test

Whether to test a tank for leaks or remain blissfully—or worriedly—ignorant of what may be happening underground is a difficult call. A leak caught early is obviously cheaper to fix than one found later. But there's always the risk of finding a bigger and much costlier problem. And know this: Anyone who discovers a leak, professional tank tester or not, is bound by federal law to report the spill to state authorities.

There's no risk in learning as much as possible about your system. Consult previous owners, neighbors and anything on record at town hall, such as installation or fire department permits. A house that isn't heated with oil isn't necessarily in the clear. There can always be a buried tank on the property, particularly if the house is older than the gas line. Even new houses can be on land once occupied by older homes. Our neighbor, who has gas heat, recently put her house up for sale and quickly went to contract. She had no knowledge of a tank on her property and told this to the future owner. Unconvinced, he brought in a metal detector and found one under the driveway. Our neighbor paid for its removal.

Most tank tests require a professional. The stick test is an exception. "I tell homeowners to get their summer fill-up in June, turn their heat off and go out and use a stick to check the level of product in the tank," says Charles Frey, vice president of Highland Tanks in Manheim, Pennsylvania. "Then check the level at the beginning of August." Of course, the stick test won't work if oil also fuels a water heater.

Water in a tank is an early warning of rust because steel tanks can corrode from the inside out. Have your oil supplier check for moisture using a chemical paste that changes color if it comes in contact with water.

If a professional test is needed, options include ones that track changes in the tank and ones that detect tracer gases in the surrounding soil. Costs run about \$400 per test. It's best to hire a testing-only company. A company that also removes tanks and cleans up afterward has a vested interest in finding a leak.

yanking the tank

All unprotected steel tanks eventually fail if they come in contact with moisture. The cause is a phenomenon called galvanic corrosion, a slow, subtle process driven by the fact that steel contains molecules with differing electrical charges. As the charges seek equilibrium, electrons transported by moisture in the soil or air convert the steel to iron oxide, more commonly known as rust. Sooner or later, a hole opens.

"The trend is absolutely to get rid of underground storage tanks," says Michael Rettig, a Memphis-based environmental attorney. Plenty of people are standing by to do the job. The fact that residential remediation is a \$100-million-a-year business has not escaped Larry the Landscaper, who just happens to have the right machinery lying around. Such people are called tank yankers, and you don't want to hire them for this risky business.

Instead, start by hiring a testing company to check the tank and the soil. Then get an environmental specialist to remove the tank. Don't even consider doing the job yourself. "When it comes to environmental matters," says John Simon, an attorney in Roseland, New Jersey, "homeowners can handle bees in the attic or a raccoon in the chimney, but they are not equipped to handle a leaking oil tank." Get suggestions from the state agency that oversees tank removal and others who have been through this ordeal. For the number of your state's tank-regulation agency, call the EPA hotline at 800-424-9346.

If the tank contains oil, the removal company should pump it dry. After adding dry ice to get rid of oxygen, workers should cut open the tank and sop up the sludge so it can't spill while the tank is being raised. Clean soil should be kept separate from any contaminated soil. When groundwater is contaminated, cleanup companies often install long, slotted PVC pipes into the ground to test and clean the water. Use of these "wells" is very expensive. A good consultant will help you find ways to limit—or eliminate—their use.

Facing a cleanup is scary, particularly if you don't know how to pay for it. Most states have funds that provide money or low-interest loans to finance cleanups. If you don't get a quick response, a flurry of letters to your legislators may help speed the process.

Most homeowner insurance policies do not cover leaking oil tanks because of pollution-exclusion clauses. But liability provisions probably do cover neighbors' costs if your oil spreads to their property.

Some homeowners can get insurance through service contracts with their oil suppliers. One of these programs is called the Homeowners Environmental Liability Plan. It costs \$50 to \$80 a year and covers cleanup and replacement costs up to \$200,000, but only for active tanks. HELP is available in Connecticut, Delaware, the District of Columbia, Maryland, Massachusetts, Michigan, New Jersey, New York, Pennsylvania, Rhode Island and Ontario, Canada.

The underground heating-oil tanks most likely to leak are bare steel, like the rusty tank pictured in the foreground at a junkyard. Its support brackets, visible at left, are proof that it was designed to be set on a frame in a basement, not buried. A 275-gallon capacity is a sign that a tank was made for aboveground use.

tank options

If you stick with oil heat, at some point you will lose faith in your underground tank. When that happens, consider an aboveground tank. A basement is a good spot because it's relatively warm. "Cold weather can adversely affect the pumping of oil in an outside, aboveground tank," says Bill Sutton of Bay Colony Home Inspections on Cape Cod in Massachusetts.

If you must install an underground tank, consider a souped-up one, such as a STIP3. For about \$900 (versus about \$400 for a basic model), you'll get a 550-gallon tank armed against galvanic corrosion in three ways. It has a protective urethane coating, dielectric bushings at each pipe connection and a sacrificial anode, usually made of zinc.

Even better are double-wall tanks. Monitors between the walls emit a signal if the inner layer springs a leak, and the outside wall can contain any oil that escapes. Residential models run about \$1,400.

Many installers recommend fiberglass tanks because they do not corrode. But fiberglass tanks are more fragile and more likely to be damaged during installation. Spherical fiberglass tanks are sturdier than ones shaped like steel tanks. A single-wall 550-gallon fiberglass tank costs about \$800; a double-wall, about \$1,600.

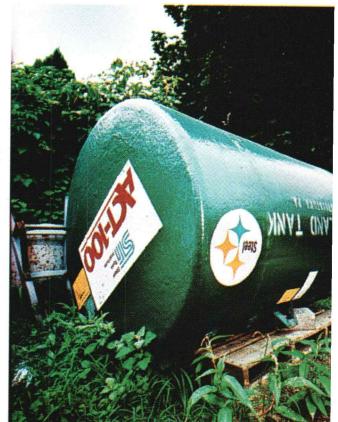
All except the basic \$400 tanks come with 30-year warranties, meaning should the tank fail in that time, it will be replaced or repaired. Cleanup is still the owner's responsibility.

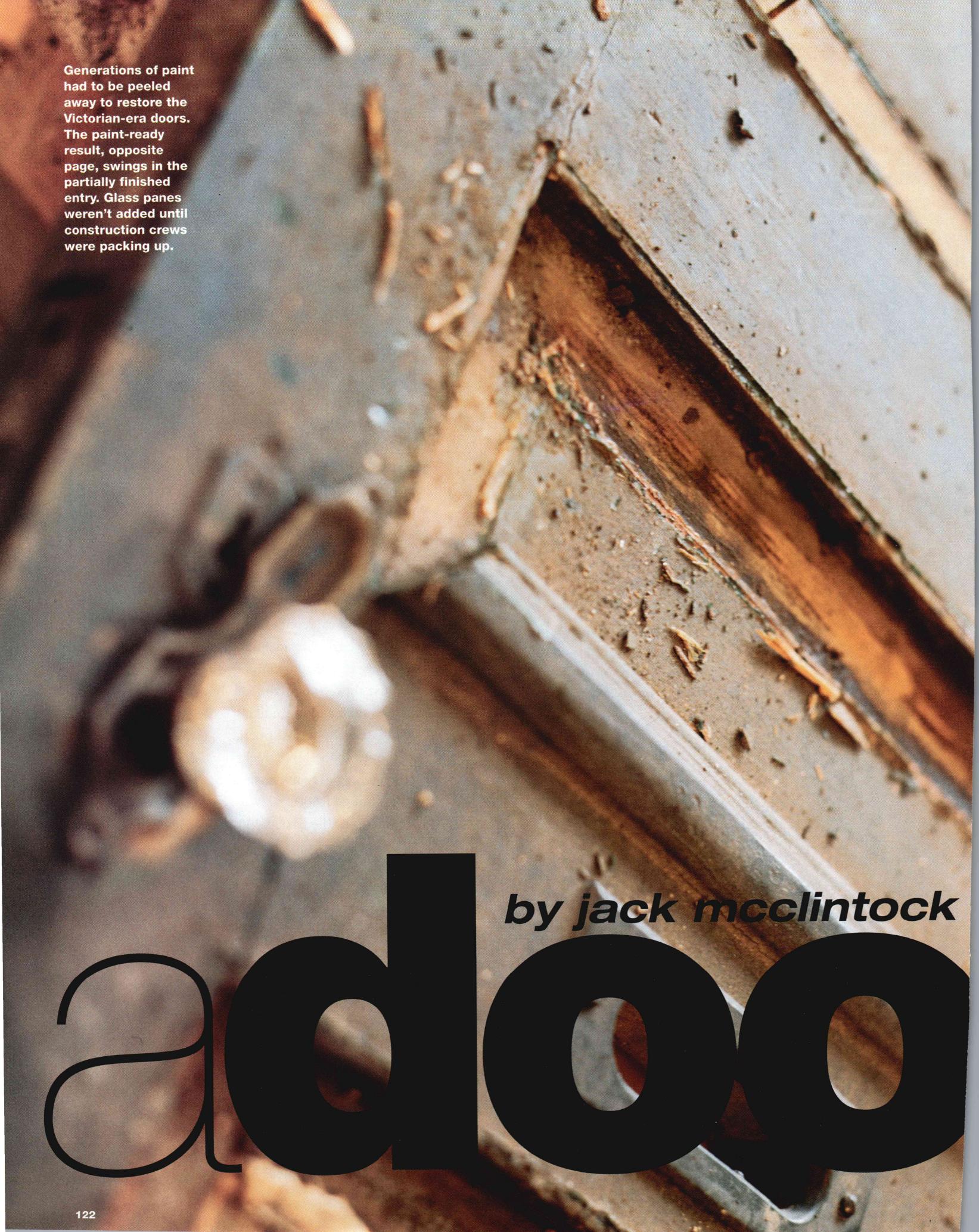
An oil dealer may do the installation or suggest a reputable company. Make sure whoever installs the tank has pollution-liability insurance. You don't want to be stuck with the cleanup if they make a mistake. Look for an installer certified to do commercial work. Most states do not regulate companies that install only residential tanks.

Another type of protected steel tank, the ACT100 has a thick fiberglass coating.



The STIP3 tank has a sacrificial zinc anode hanging from it like a white buoy.





Generations of paint had to be peeled away to restore the Victorian-era doors. The paint-ready result, opposite page, swings in the partially finished entry. Glass panes weren't added until construction crews were packing up.

addo

by jack mcclintock



nantucket

A door, for openers, is a hole in the wall with a movable panel. But the case isn't open and shut. A door can be beautiful. Or it can be badly placed, visually meek, awkward to use, flimsy and insecure, pretentious, out of scale or the wrong style. The worst thing a door

can be is uninviting, because the entryway is, above all, a welcoming device.

The door of Craig and Kathy McGraw Bentley's house at 3 Milk St. in Nantucket was an oddity, designer Jock Gifford says. "Kathy, the homeowner, liked it. But some-

photographs by luca trovato



ABOVE: Tension is high in Bruce Killen's shop as moldings are pried off to free the surviving cut-glass pane. **RIGHT:** Cracks were filled with epoxy before the doors were cranked tight.

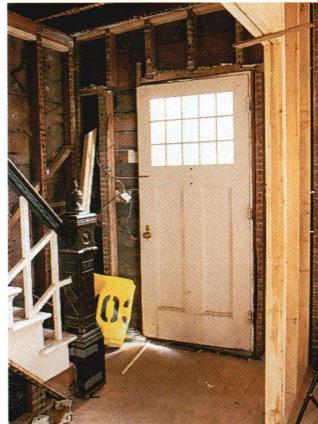
thing was funny—you opened it from the inside and it pinned you up against the newel post.”

And it didn't look right. *This Old House* producer Bruce Irving thought it resembled “a broken tooth” because the house was Victorian, built in 1887, yet the door seemed wimpy. Victorian entries were imposing, often double doors with inset glass panels, fancy hardware and carved frames. They made a statement about the owners' wealth and position. “The Victorians felt that if Buckingham Palace and Versailles had double doors, then it was high art and that was the way to do it,” Gifford says.

When Irving tracked down descendants of the former owner, family photographs of the house's early days proved him and Gifford right. The front door, it turned out, had been added in 1918 because the original doors leaked. The front entry in the picture had double doors with cut-glass panels in their upper halves, sheltered by a bracketed portico roof.

Then came Craig Bentley's lucky find. While cleaning out the crawl space, he found the original doors under piles of lumber, old bottles and high-button shoes. The two panels were thick with paint and varnish, the hardware was corroded, and one of the cut-glass panels had been broken. The Bentleys decided to redo the front entry: build a new porch, reconstruct the rooflet with its fancy brackets, refinish the doors and welcome them home.

In contractor Bruce Killen's shop, Kevin Lipe carefully removed the hardware and moldings, which had been installed with cut nails and putty when the house was new. The moldings were impossible to reuse; they had to be chipped out carefully in slivers so the surviving glass panel wouldn't be damaged. It was “nerve-racking” work, Lipe says. Before it was done, he was picking at



ABOVE LEFT: When the Bentleys bought the house, it came with a door that had been installed in 1918. **LEFT:** The original doorway of 1887.





the moldings with a quarter-inch chisel and muttering, with a grin, "I could get this out faster if I broke it."

Killen traced the molding's profile, ordered custom molder-planer knives from a Chicago firm—two for \$165—and made new moldings of straight-grained ponderosa pine.

His crew ran the doors through a big power sander because a planer would have roughed the cross-grain of the rails. Lipe used a heat gun and putty knife to lift old paint from the recessed lower panels. The wood was a pale, handsome sugar pine. The joints between the stiles and rails had opened over the years, and painters had simply puttied them before repainting. Now Killen's men cleaned out the putty, filled the cracks with epoxy and, embracing each door with bar clamps, cranked the parts back together, listening to them creak and pop as they moved.

From Gifford, *This Old House* master carpenter Norm Abram got half-scale drawings of the portico brackets. He set about building copies in remilled mahogany and rot-resistant

cypress salvaged from the beer vats of a defunct Narragansett brewery. Norm first made plywood patterns, then cut the flat pieces on a band saw and turned the round ones on a lathe. While he was at it, he made extra brackets for the rear door so that the house's two entries would have similar aesthetic elements.

It was a challenging job. For such a simple house, the brackets were complicated: Each had to be made of 21 parts, fabricated and finished separately and then glued and screwed together before it could be painted and mounted. Fifteen hours of work went into each bracket, and Norm guessed later that with materials, each would have cost at least \$750 to purchase.

The roof, the brackets, a new wooden front porch in the cramped space between doorway and sidewalk, the doors themselves—all were coming together nicely. But what do to about the broken glass? How to find the cut-glass artists of 1996?

"Twenty years ago you couldn't have found a guy to do this glass, but the lost arts are becoming easier to find," Gifford says. "There's been a real resurgence in craft work."

Irving made a careful rubbing of the pattern on the glass—a simple design of vines and fruit—and

LEFT: Easing the edges with sandpaper, Norm Abram finishes one of four brackets he built from mahogany and recycled cypress. **BETWEEN:** With the portico roof in place, Steve Thomas, Bruce Killen and crew members hoist the brackets for the front entry.



A wizard of wheel-cut glass

Twenty-five hundred miles from Nantucket, in a studio beside an automobile junkyard in Oakland, California, Andreas Lehmann pressed a sheet of frosted glass against a whirling wheel. Water dribbled from the glass and Lehmann's rubber apron into the rolled-up cuffs of his khakis.

DAVID PETERSON



Using his body as a brace, Lehmann pushes the glass against a whirling abrasive wheel.

The wheel bit into the pane with a screech. Lehmann, Band-Aids covering cuts on his fingers, manipulated the glass fearlessly, cutting into its surface a graceful design to match a pattern of the front door glass at 3 Milk St. on Nantucket. He pressed hard to get an olive shape from the wheel's rounded profile. He angled the glass to the wheel's edge and drew it toward him to add a little tail, making a leaf. He swept it in an arc to make a twining, vinelike line. "This is how your grandmother's cut crystal was done," he said in a slight German accent, glancing up from his work.

Lehmann, 40, studied his trade for three years in Germany. He knows of only four people in the United States who can do such large-scale jobs in what is formally known as wheel-cut glass. He estimates he has done 500 of them, for \$90 to \$300 per square foot. This one-day job will run about \$400.

He had begun by frosting the entire pane—sprinkling on silicon carbide grit, then "scrubbing" it with another piece of glass. Then he penciled the design onto the frost and did the rough cutting. A trickle of water cooled the aluminum-oxide ceramic wheel as he made the freehand cuts, going over each cut two or three times to deepen it. On heavier work, he suspends the glass by suction cups from a counterbalanced network of cables and sash weights overhead. Once, a job that had taken him a month cracked on the way to its shipping crate; Lehmann simply returned to his wheel and started over. The price of insurance against such catastrophes is prohibitive, he says.

When he had finished cutting the design, he polished the cuts with a slurry of pumice on a cork wheel. This left behind a milky veil, which he removed before rubbing the glass with an optical polishing compound on a felt wheel. "That makes it brilliant, like a lens."

Polishing had blurred the edges of the design, so Lehmann frosted the glass again, which made the edges of each olive and vine crisp and sharp. Finished, he rinsed the pane and held it to the light, squinting with satisfaction at the lenses in the frost.



LUCA TROVATO



DAVID PETERSON

Lehmann worked from a rubbing that had been taken the intact pane. ABOVE: He checks his work on the olive-vine design. He'll sign the glass when he's satisfied.

sent it to a German-trained craftsman, Andreas Lehmann, in Oakland, California. Three weeks later, a crate containing the new glass panel arrived in Nantucket.

Once the house's exterior shingles and interior paneling had been removed, the position of the original doors was evident. They had been about six inches wider than the single door that replaced them. It was a simple matter to reopen the hole and frame in new mahogany jambs. Also visible was the original portico roof line, which had etched itself on the sheathing as the old zinc flashing corroded and dissolved. Killen's crew rebuilt the portico. Norm's brackets were attached to the house with marine adhesive and screws. The new glass went into the door, the refinished doors went between the new jambs.

There wasn't enough space for a Nantucket friendship stair, the sort that goes up one side of the porch and down the other. But the small, neat porch and the twin refinished doors would offer a double Nantucket welcome.

A nearly perfect match: Once the panes are installed, it will be hard to tell the replacement, on the left, from the original glass.





Proportioned as if on a ship, small windows invite glances
into The Little House, built about 1885 in Sconset.

the doors of nantucket



On Nantucket, a six-panel door is called Quaker-style and often dressed with shutters.



A batten door, on what's known as The Little Red House, is built like a ship's hatch.



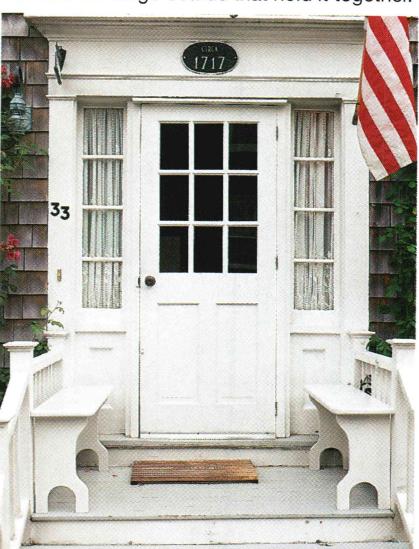
An open batten door on The Little Red House reveals the ledge boards that hold it together.



Whaling money built this ornate circa-1875 Victorian entry with Second Empire brackets.



Strap hinges and bar latches were common elements of late-19th-century Nantucket style.



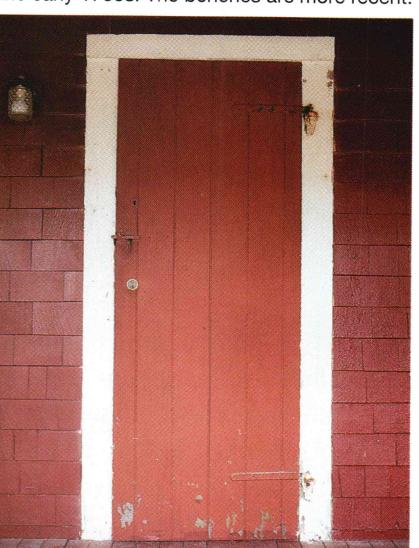
Federal formality characterizes an entry from the early 1700s. The benches are more recent.



From an era with fewer security concerns, a rope pull lifts the latch inside this 1814 door.



Like 19th-century Victorian details, brackets for this 1991 house came from a catalog.



The essence of simplicity: strap hinges, a latch and no doorknob.

We Just Don't Know When To Quit.



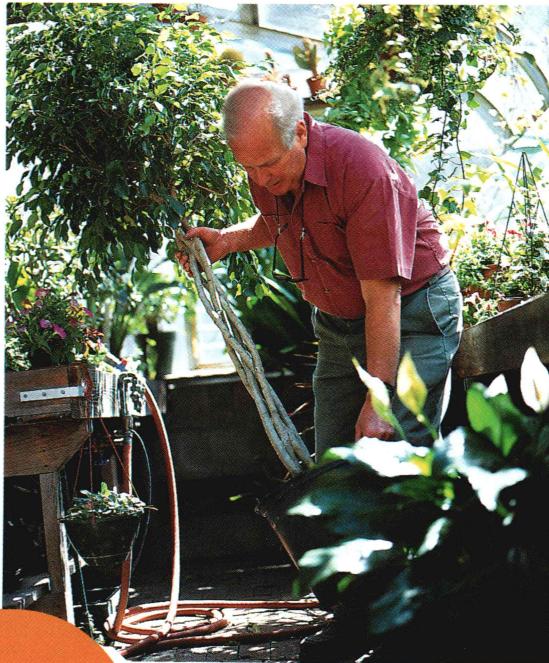
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in the garden



P

rofessing not to envy those who can harvest raspberries and garden peas this month, Russ

Morash says he welcomes the forced slowdown that the end of autumn brings at his home in Massachusetts.

"If I gardened 12 months of the year, I'd never get into my workshop," he says. "Everything in its season works fine for me." For gardeners, late fall and winter are for reflecting on what worked in the garden last summer and what to change next year. For many, the biggest challenge is **defeating deer** (PAGE 134).

Others ponder how to convert open yards into private retreats. Russ suggests a **privet hedge** (PAGE 143). Gardeners thinking about next spring can build a **cold frame** (PAGE 140) to shelter tender seedlings until they're hardy enough to be planted in the open.

We wrote a new book. Then we bought it.

Dodge Ram is the truck that changed the rules and rewrote the book on full-size pickups. And now it's available in a handsome leather-bound edition.

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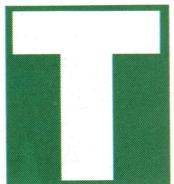
America's Truck Stop  The New Dodge

ew rule book.
nd it in leather.



life with bambi

***How does your garden grow?
With lion dung and milk jugs hung and
fence posts all in a row***



here are nine miles of Atlantic Ocean between the island where I live and the mainland of Rhode Island. Designated by the Nature Conservancy as one of the nation's "last great places," Block Island has a rare indigenous vole, a rare burying beetle and a hawk so rare I've never seen one. We have no woodchucks, no squirrels, no poisonous snakes.

We had no deer, either. But in 1967, a local visionary thought whitetail deer would be an addition to the scenery, so three does and a buck were loosed. When

one gardener protested, the visionary assured her that "deer prefer grass and green apples." That was the end of Eden.

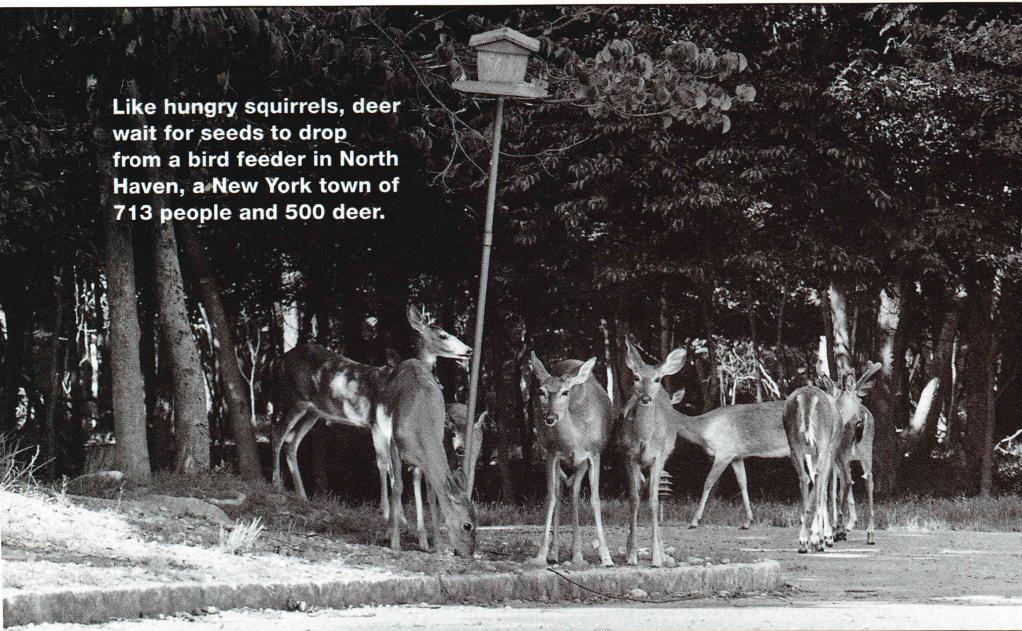
It is now almost three decades A.D. The deer were fruitful, and they have multiplied to the point that we now have about one deer per permanent resident—800 or thereabouts—and perhaps as many as 70 per square mile. Never mind green apples, these creatures eat the scenery: tulips, tender hosta shoots, roses, rhododendrons, azaleas, even vegetables (except good-for-you crucifers like broccoli).

I am lucky enough to entertain only the occasional hungry deer that flees down the beach, leaps the dunes and crosses our well-traveled road for a night on the town. Even so, the sight of months of labor cropped to the roots has caused me to despair. I have tried

scarecrows, plastic owls, snow fence and whirligigs made from milk jugs. I have tried staking the dog nearby, planting nasty-tasting plants (deer usually don't like pungent flavors such as onion, lemon, mint, lavender or sage), playing loud music and even encouraging the men of the household to water the perimeter.

Truly dedicated gardeners turn for help to the catalog of a Maryland outfit called Deerbusters. The cover shows a deer chomping on garden flowers. Inside are motion-activated sonic warning devices, strobe lights, electronically activated

Like hungry squirrels, deer wait for seeds to drop from a bird feeder in North Haven, a New York town of 713 people and 500 deer.



BY CLAUDIA GLENN DOWLING

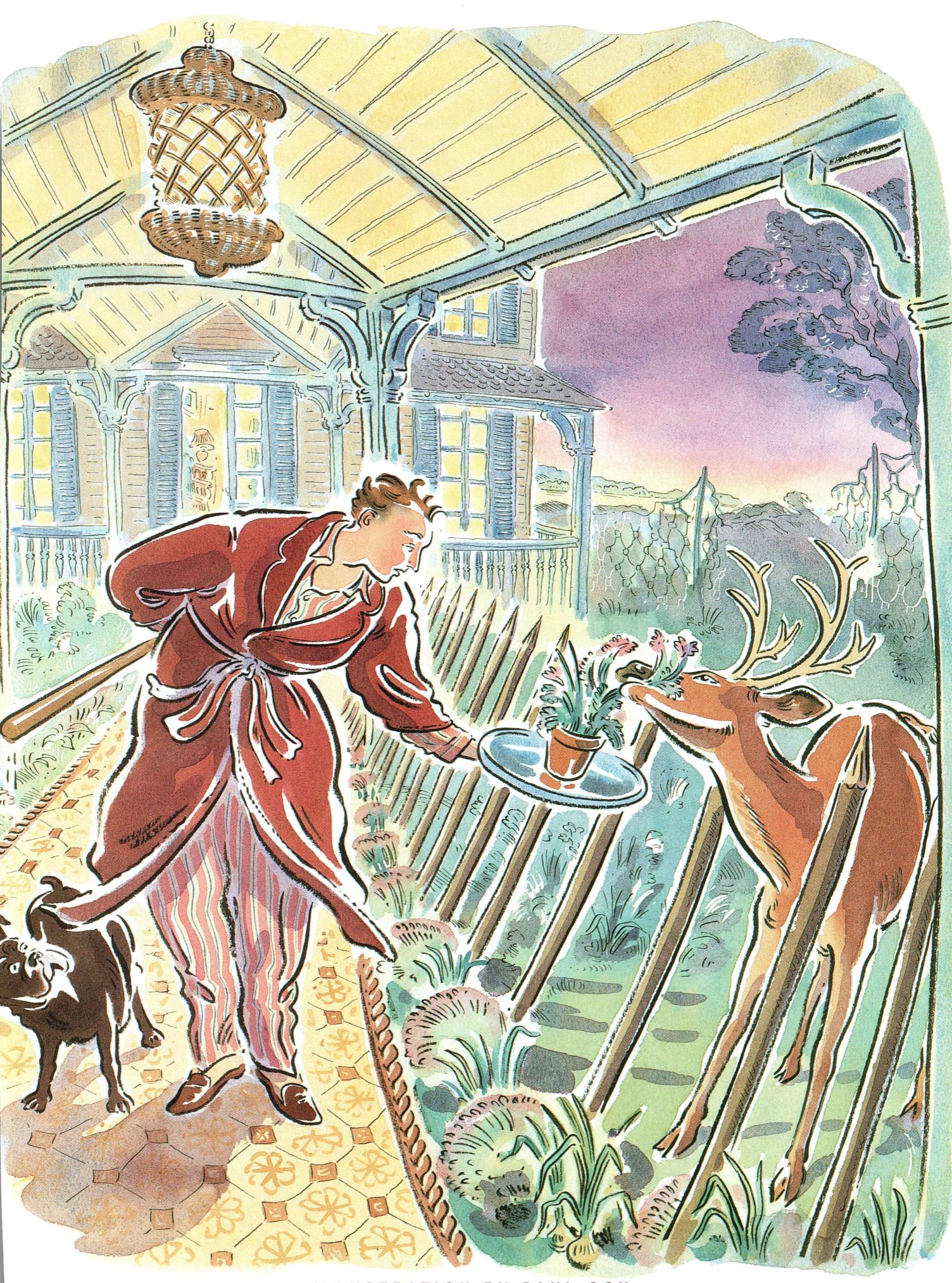


ILLUSTRATION BY PAUL COX

fencing out problems



At his summer home on Nantucket, Russ Morash tries a deer deterrent that many swear by: polypropylene netting. Because the goal is to confuse deer rather than to block them by using brute force, the fence can be flimsy and easy to remove. Morash staples the netting to inch-thick finger-jointed redwood, sold as grounds to help plasterers gauge plaster thickness. Then he pounds the posts into the ground. A tightly spaced picket fence keeps out rabbits.



PHOTOGRAPHS BY KELLER & KELLER

water sprayers, hot-pepper wax, underground dog fences, predator-urine repellents, a peanut-butter bait that attracts deer to electric fencing, even "home remedies" made of soap, human hair and blood meal.

"People have tried just about everything imaginable," says Mike Fargione, a Cornell University biologist who has tested commercial repellents. "Some home remedies do work, but none work 100 percent. The amount of control you have is proportionate to what you spend."

A moat is good, like the nine-mile-wide one Block Island used to have. Of the more practical solutions, fencing is best. But it's expensive, requires a lot of upkeep and looks ugly. Eight-foot-high wire mesh is considered secure. An outfit in the appropriately named New Hope, Pennsylvania, sells a reasonably priced seven-and-a-half-foot polypropylene two-inch mesh that many swear by. (A similar one-inch mesh, sold as bird netting, comes in 14-foot widths.) Double fencing—five feet high and five feet

apart—causes deer to look before they leap; without a clear landing field, they give up. Electric fences can be effective if they are at least five feet high with wires no more than eight inches apart, have at least 4,000 (preferably even 8,000) volts of electricity and are well grounded at about double the manufacturers' suggested number of points. Electric fences are illegal in many suburban areas; check local ordinances. They don't provide strong shocks in deep snow, frozen ground or dry weather, so pray for rain.

The key is to put up a fence early and make it impenetrable. "Deer are creatures of habit. They imprint on landscaped areas for browsing as fawns," says Brad Roeller, who has been testing fences, plantings and repellents at the Institute of Ecosystems Studies in Millbrook, New York. "If a fence fails or isn't put up quickly enough and deer get in, there's no way you're going to keep them out."

RUSS SAYS:

"I have absolutely no use for deer. I have seen brave gardeners weep when they talk of plants that were assassinated by the marauders. And there's another reason to fear them—they are walking disease vectors. Yet it is politically incorrect to do anything about them. On Nantucket, we call hunting season Deer Week. It should be Deer Year."

Repellents work best in spring and fall, when deer have many entrées to choose from. Most repellents make plants taste or smell bad by using pepper, mustard, rotten eggs, garlic, tobacco, coyote and bear urine, ammonium soaps and naphthalene (essence of mothball). Obviously, some of these flavors are less than ideal for salad greens. Other drawbacks: Repellents need to be reapplied frequently, every few weeks or after rain, and may damage plants if applied in temperatures below 40 degrees Fahrenheit.

The path of least resistance is to concentrate on plantings that don't appeal to deer. Much of this knowledge is folkloric: What works for your neighbor may work for you. At the Institute of Ecosystems Studies, Roeller is researching ornamental plants in a more methodical way. Using information gathered by Cornell University from thousands of landscapers and gardeners, he planted test beds. One has shrubs that browsers don't like, such as barberry, forsythia, boxwood, juniper, quince and paper birch. Another bed intersperses these plants with varieties that deer prefer, including redbud, American holly and rhododendron. It is in this bed, regularly visited by whitetails, that Roeller evaluates repellents, fence systems and

hundreds of different plant species.

The bottom line is that all sorts of methods work—until they don't. "I have an electric fence around a perennial garden that for twelve years worked like a top," Roeller says. "During the last two years, the deer were so stressed they were going in despite being shocked." In a bad mast year (one with few acorns or nuts for fall forage), during a summer drought or after a deep winter snow that makes browsing difficult, desperate deer will get through any fence or repellent to eat any green and living thing.

In most parts of the country, whitetail deer have no natural predators—no wolves or mountain lions or bears. The only predators on Block Island are hunters, cars and airplanes. (Yes, several small planes have hit deer on the runway, to the detriment of both.) In 1973, the town council declared that, to thin the herd, hunting would be permitted on a single day during the winter. At the time, there were 500 residents on the

island; 270 signed a petition against the hunt, terming it "dangerous" and a "slaughter." Council President Herbert Whitman canceled the one-day shoot.

"Our people just don't want these deer shot. The whole idea fills them with horror," he said at the time. "Some of them are so tame you could lasso them, if you were good enough with a rope. Shooting

them would be like going into a barnyard and shooting cows." Let's face it, deer are cute. Leggy, liquid-eyed, graceful and shy, they seem as innocent as children. Kill a kid?

So that was that for hunting—until Lyme disease, a serious illness transmitted

by deer ticks, was identified in Lyme, Connecticut, just across the water. By 1978, islanders had begun to suffer rashes and fevers with neurological and rheumatological complications such as paralysis, arthritis and heart attacks. By 1989, almost half the people on Block Island reported that they had suffered symptoms at least once. That winter, 217 deer were killed with permits. Every year thenceforth, the Council heard complaints from what gardeners dub "the Bambi faction," but the hunting has continued. Last season, 62 deer were taken, for a total of 1,409 since permit hunting began in 1985.

In an effort to address the problem without bloodshed,

the town has tried to donate the deer to parks or deer farmers, hired zoologists to study the situation and consulted park and wildlife experts from as far away as San Francisco, to no avail. This November's ballot asks whether the New Shoreham Town Council should "drastically reduce" the island's deer population by "safe and controlled hunting and other

herd-reduction procedures."

One conservationist who has had Lyme disease five times looks at her rare evergreens, nibbled to death despite all the protective measures she and the experts could devise, and says sadly, "I was just trying to make something beautiful."

After spending almost \$10,000 on deer-related defenses and hundreds of hours of politicking for solutions, she says, "I gave up in disgust. They should just give poachers carte blanche."

In heavily populated suburbs, hunting is impractical—and not just for reasons of safety. Deer are so numerous that new herds soon migrate to areas where others have been culled. It is estimated that the continental United States now harbors 25 million deer. At the turn of the century, there were just half a million. Because of fears deer might become extinct, many areas banned hunting. When it resumed in the 1920s, only bucks could be shot. Equality between the sexes came just in the past few decades. But by then, herds had swelled. Suburban sprawl provided attractive tree cover and forage. Better leash laws controlled dogs, deer's main predator nowadays. Mild winters allowed many fawns to survive.

"It's hard to name a major metropolitan area across the country that doesn't have a deer problem," says Paul Curtis, an extension wildlife specialist for Cornell. "All fencing, repellents and plantings do nothing to address the major issue, which is too many deer in some places." From defense, Curtis has turned his attention to offense: contraception. He has tested two drugs that are effective, but administering them is difficult and costly.

Personally, I'm headed for the polls, recalling the words of the town council president who said, "If God had wanted deer on Block Island, he would have put them here." Meanwhile I'll man the fort, live on onions and kale, watch the weather and plead, "Please don't eat the daisies." Fortunately, deer don't much like daisies.

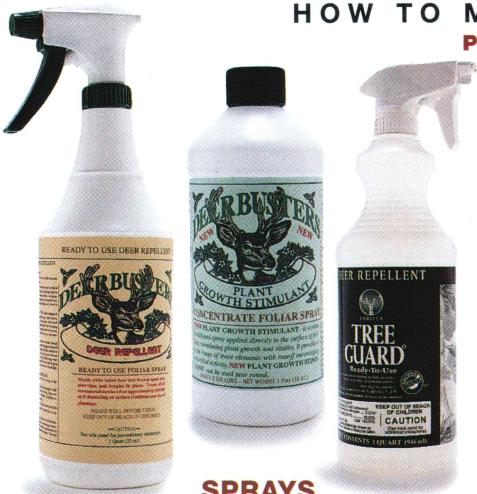
other barriers



From top, cloth ribbons alert deer to a mesh fence with electrified wires. Bird netting protects individual bushes. Slanted wires charged with at least 4,000 volts deter jumpers but must be kept clear of vegetation.

scare tactics

HOW TO MAKE THE DEER DINE ELSEWHERE
PHOTOGRAPHS BY REED DAVIS



SPRAYS

Repellents add flavors or smells deer don't like. The downside: They must be reapplied often. Use on prized plants or to protect small plants until they are large enough to withstand nibbling.



SCARECROW

Dorky but cheap. To make: Cut holes in a milk jug. Glue on patches of foil. Suspend from a string.



DEER POPS

Foil discs laced with lure hang on electric fences to attract deer, then deliver a shock to scare them away.



FOAM DARTS

Can be stuck near vulnerable plants so leaves don't have to be coated with repellent. Foam absorbs chemicals, extending the time needed between applications.



PREDATOR URINE

Collected from penned coyotes at game farms and zoos. Triggers a deer's instincts to stay away from predators.



HOME RECIPE

One nurseryman's brew: two eggs, a cup each of skim milk and water, two teaspoons of garden-store spreader-sticker to keep spray on leaves.



STINKY SACHET

Cloth bag contains soap, human hair, blood meal and other ingredients. Rain is said to enhance the scent.



SUPER SPRAYER

Motion-activated sprinkler is said to keep deer (and human intruders) away. Bird decals optional.



SOUND AND LIGHT

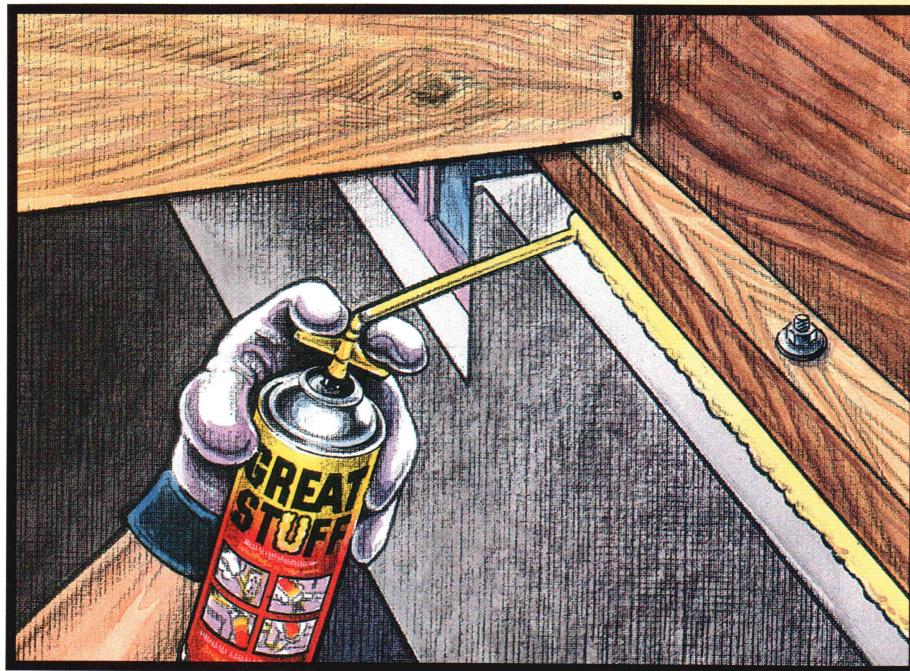
Bright lights and sound waves too high-pitched for humans to detect can chase away deer. The device in the middle even changes its sound and light pattern each time it reactivates. Some models can be attached to cars to startle deer.

OR...



FIDO

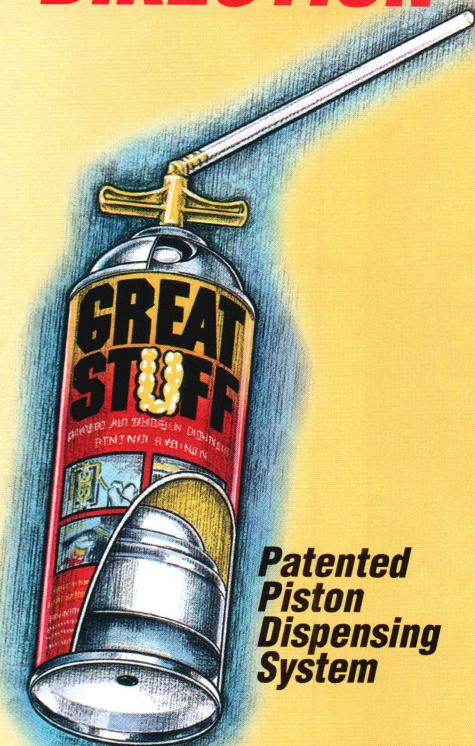
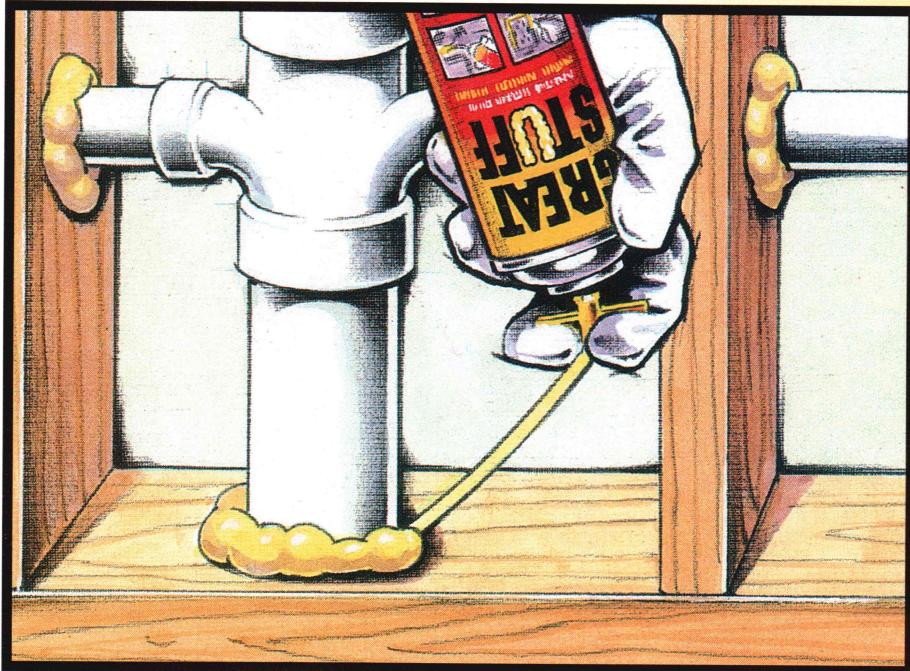
A sure bet to frighten deer. Corral your dog with an underground wire linked to a shocker on the collar.



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Original

All Direction

A color photograph of an elderly man with grey hair, wearing a blue denim shirt and light-colored pants, bending over to spray water from a hose onto young plants growing in a wooden cold frame. The cold frame is made of wood and glass, and is situated in a garden with various other plants and a chain-link fence in the background.

RUSS SAYS:

"A cold frame can be used for many things other than starting seedlings. Here's my calendar:

EARLY MARCH: Move first seedlings of lettuce, broccoli, cabbage into cold frames.

APRIL: Move those plants into garden; add tomatoes, other vegetables to cold frames.

MAY: Those go out; eggplant, melons, cucumbers move in.

JUNE-JULY: Convert cold frames to mini lath houses for newly rooted shrub cuttings and perennial seeds sown for bloom the following year.

AUGUST: Start fall crops in cold frame because garden is full.

SEPTEMBER 15: Sow last lettuces for harvest by Thanksgiving."

cold frame

*A simple halfway house gets
seedlings ready for the great outdoors*

V

isitors to Russ Morash's garden gawk at his brown-eyed Susans, larger than any they've seen. They lust after his delicate European lettuces and sneak handfuls of his heirloom cherry tomatoes. Everything, from radishes to rhododendrons, is stellar. One reason is that he nurtures his soil as carefully as he does his plants. Another is that he does not simply set out six-packs of whatever the local garden center is selling. He selects seeds from dozens of mail-order companies that cater to fussy gardeners.

In the dead of winter, many gardeners have the best intentions of doing what Russ does. They order the seeds, but the seeds never make it out of their envelopes. In Russ's yard, seeds actually graduate into robust plants. He starts them in his greenhouse or in pots on windowsills. When they've grown a bit, he moves them out of these cozy spots to a row of clear-topped wooden boxes—his cold frames—beside his vegetable garden. They provide some shelter, but not too much. Russ knows that raising seedlings is not unlike raising children: The goal is to wean young ones from being pampered so they are hardy enough to survive life outside. "You don't want them to grow too quickly," he says of his plants. "You want them to get accustomed to hardship."

Russ's cold frames go into use in early spring as nurseries for tender plants, evolve into summertime halfway houses for cuttings that need special care and wind up as permanent homes for his final crops of the year. Some northern gardeners harvest salad greens from cold frames all winter, but Russ picks his last lettuces late in the fall, before he heads off to a warmer city to supervise filming of *This Old House*'s winter project.

Even when nights are below freezing, afternoon sunshine can quickly bake plants inside a cold frame. For gardeners with time to putter, it's a pleasant daily ritual to raise the lid when the sun shines. Busier gardeners will want a solar-powered vent that automatically opens the lid when the inside gets too hot. During the summer, the tops should be removed and replaced with shade cloth or lath to shelter plants from too much sun.

Russ started using cold frames years ago, after he saw some on a visit to Holland. His first cold frames had old storm windows for lids. "We just put on hinges," he recalls. "But there comes that windy March day when everything falls apart and you have to pick the shards of glass out of the seedlings. It's not much fun."

He tried using translucent, corrugated plastic for lids but disliked the material. "It was strong, but it didn't transmit as much light. And it was ugly." About six years ago, he discovered double-wall polycarbonate, the material used in many modern greenhouses. The plastic sheets have H-shaped channels that create an insulating layer of air. When the cold frame slants to catch the sun's rays, as the one being built here by master carpenter Norm Abram does, the top edge is sealed with foil tape to keep out rain; the bottom edge is covered with a breathable white fabric tape that allows any moisture inside to escape. The plastic sheets are lightweight and sturdy. "We've never replaced a piece yet," Russ says.

BUILD IT NOW

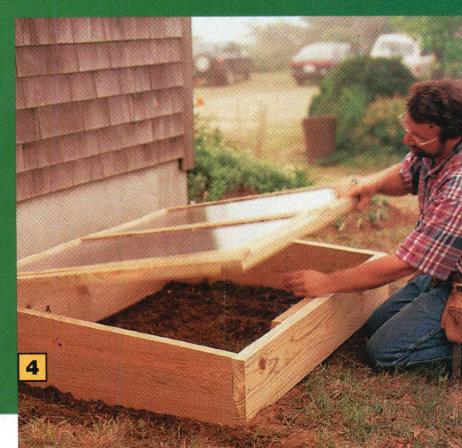
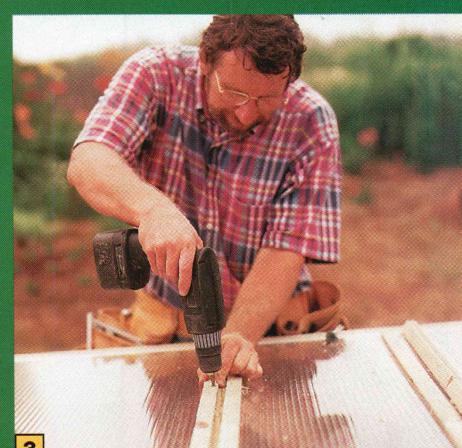
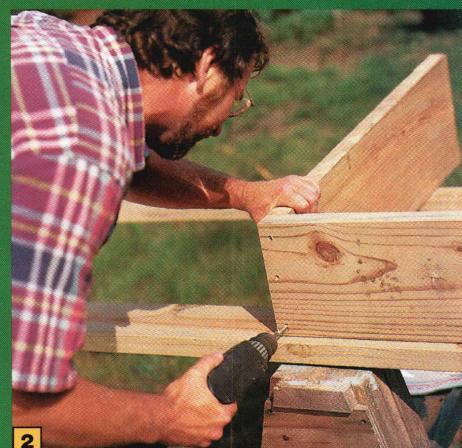
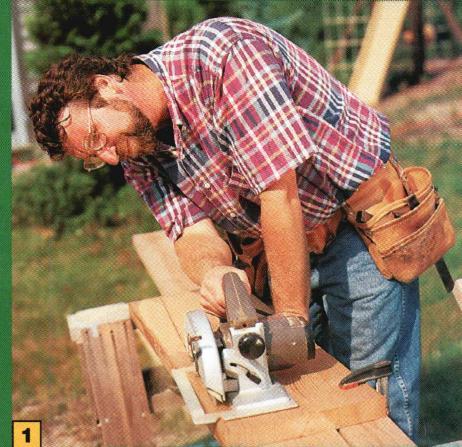
It's possible to buy a cold frame, but making one is a satisfying winter weekend project. Master carpenter Norm Abram starts with 2x12 boards of pressure-treated pine. He cuts the front and back pieces 51 inches long and the sides 39 inches long, a good size for plastic nursery trays. He wants the cover to slope toward the sun and allow water to run off, so he cuts a 5-degree bevel on the top edge of the front and back pieces and rips the front piece to a width of 8 inches.

1. With a circular saw, Norm rips the sides at an angle, from full width in back to 8 inches in front.

2. He secures the front to the sides with 3½-inch galvanized deck screws.

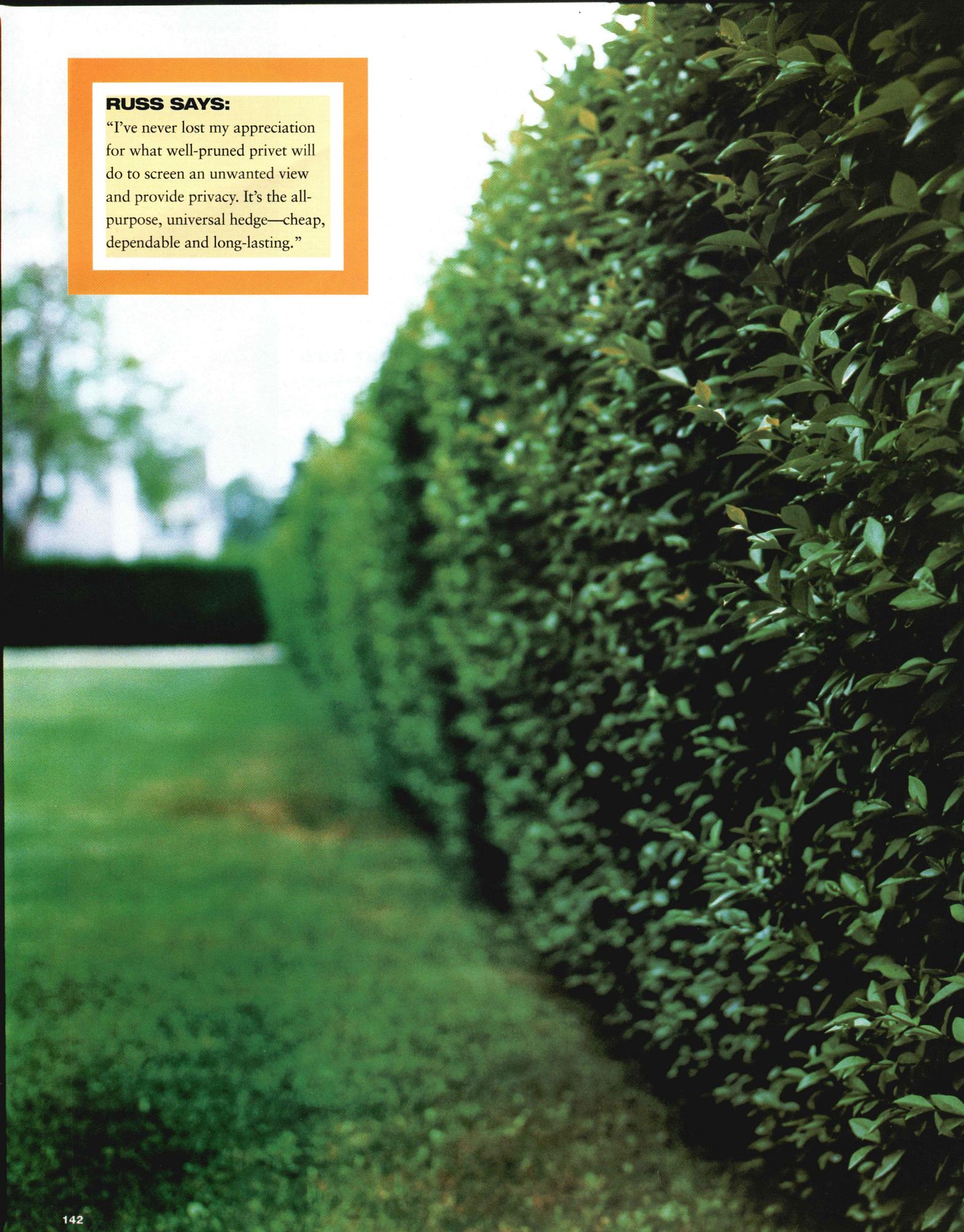
3. The cover is made from 2x6s ripped in half lengthwise and half-lapped at the corners. Norm adds a center divider to support a solar opener and routs a groove for the glazing. He screws on narrow wooden strips to hold the plastic in place.

4. Simple hinges hold the top to the frame.



RUSS SAYS:

"I've never lost my appreciation for what well-pruned privet will do to screen an unwanted view and provide privacy. It's the all-purpose, universal hedge—cheap, dependable and long-lasting."



privet hedge



A nearly indestructible wall of privacy that grows more than a foot a year

Surrounded by a featureless expanse of sea, island inhabitants seem to crave a cozy definition of their outdoor space. On Nantucket, this purpose is accomplished by the liberal use of privet. Crisply trimmed privet hedges mark off lawns and gardens, and privet arches serve as living gateways. The best are grown in the island's village of Sconset, where there are even privet whales with privet spouts, a topiary taming of the ocean next door.

"Privet is a living fence," says Nantucket landscaper Marty McGowan, "and the more you prune it, the thicker it gets." Although the Oxford English Dictionary lists "origin unknown" for the common name of the genus *Ligustrum*, McGowan ventures an etymological leap: "It must have something to do with privacy," he says. "That's what privet is all about."

BY WILLIAM G. SCHELLER

PHOTOGRAPHS BY IMKE LASS

Privet has evergreen and deciduous varieties, all relatives of the olive. The privet commonly used for hedges and topiary in temperate regions is *Ligustrum ovalifolium*, or California privet, which is hardy to about zero degrees Fahrenheit. California privet and the even more cold-hardy *L. amurense* (or Amur privet, from east Asia) are deciduous. Their shiny, dark-green leaves can remain on branches well into early winter; in summer, sprays of small white blossoms appear unless the plants have been pruned severely.

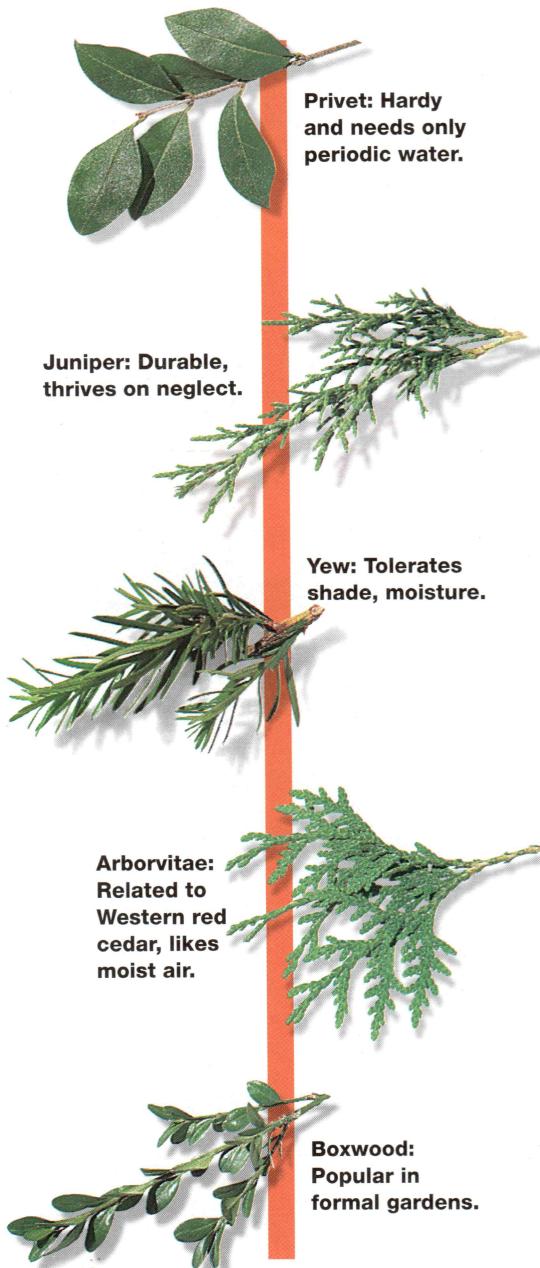
Spouting whales aside, when most people think of privet they think of hedges. Privet "grows up more than out," says McGowan, and this natural tendency, combined with the plant's dense foliage, will produce an opaque screen within a few years.

McGowan recommends planting privet in a trench two feet wide and 18 to 24 inches deep. Space plants one foot apart, and cover the roots in soil right up to the point where the trunk begins to branch. "Privet is one of those plants, like tomatoes, that will put a root out of its side anywhere it's in contact with soil," McGowan says.

Because it's so fast-growing in either sun or shade, privet can become a pest. Kris Johnson, supervisory naturalist for the Great Smoky Mountains National Park in Tennessee and North Carolina, says her crews have spent many hours eradicating the plant. "It can really take over the forest," she says. "Don't plant it next to a meadow or woodlot." Mowing alongside a hedge will keep it in bounds, and regular clipping will prevent formation of seeds that birds might spread.

Pruning a privet hedge is neither an arcane science nor a full-time career.

privet and its pretenders

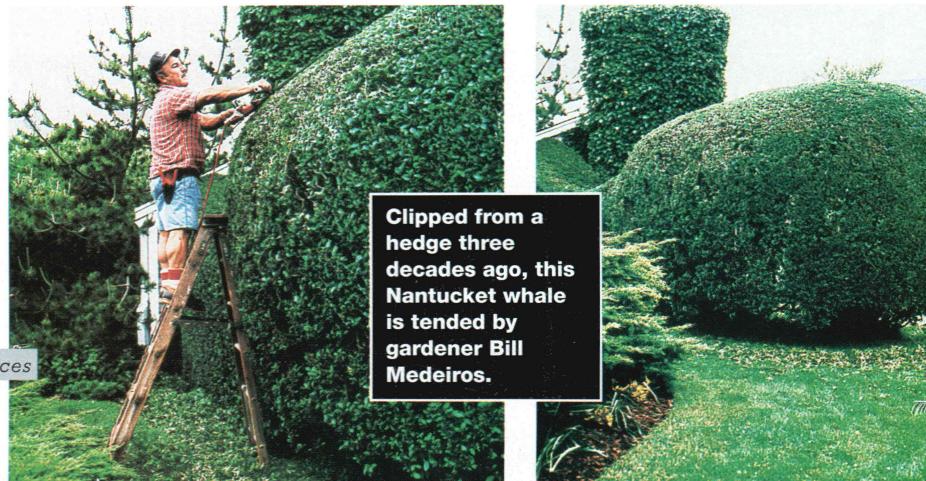


All branches should have access to sunlight. McGowan favors pruning in an upside-down V shape—wider at the bottom than at the top. "If you do it the other way around, the branches at the bottom will die from not getting enough sun." Most hedge fanciers favor level tops, which allow sunlight to fall evenly on the top branches, where 70 percent of new growth occurs. Two cuttings per growing season are usually sufficient. A finer, chiseled look might require three or four cuttings.

Nantucket doesn't allow man-made fences to be more than six feet high, but there's no restriction on the height of a hedge. One 20-footer on Main Street in Sconset got that big in only 18 years. Nearby, a privet allée is commodious enough to let cars pass beneath. As for Moby Dick out in the back-yard, he can grow as large as he likes.

LEAFY MENAGERIE

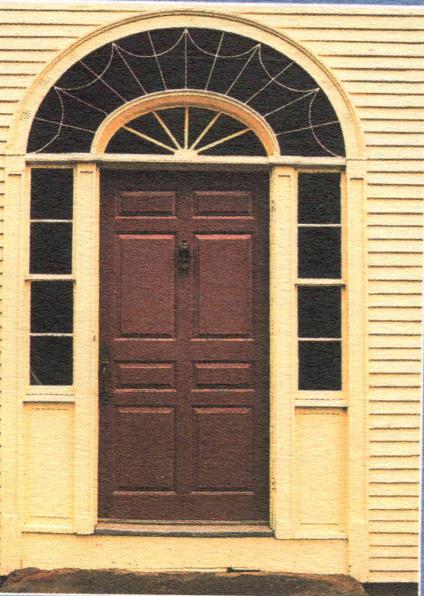
America's northernmost major topiary garden, Green Animals in Portsmouth, Rhode Island, was started by an estate owner and his gardener in 1912 and features more than a score of the original plantings, nearly all of them sculpted from California privet. "Privet's great for topiary because it's so malleable," says head gardener Crisse MacFadyen Genga. "It also grows so fast that it's perfect for today's impatient gardeners.' Green Animals has two topiaries made of yew, an evergreen that can be enjoyed year-round. But privet is more resistant to insects and disease.



♦ See Directory, on page 145, for details and sources

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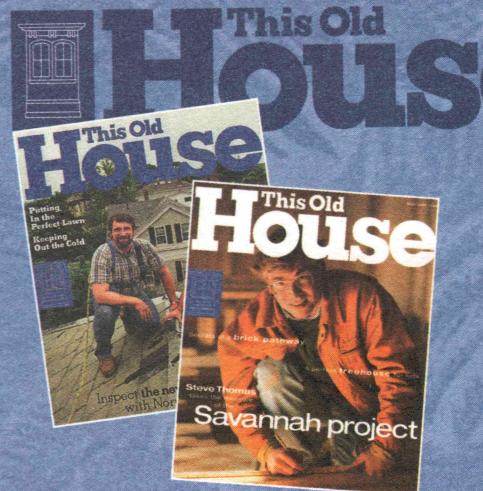
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Directory

resource guide for the home and garden



Directory

A listing

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 - a) have plenty of cup holders."
 - b) be ready for production by the fall."
 - c) have one hell of an attitude."
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Drawing to be held on 1/31/97. Illegible, late, lost, postage due, damaged, and facsimile entries will not be considered. Winner will be determined in a random drawing by an independent judge whose decision is final. Winner will be notified by mail. Winner will be awarded an 8 mm camcorder (Value: \$500). Winner pays any taxes. No substitution or transfer of prizes. Employees (and their immediate families) of *This Old House* magazine, Chrysler dealers, and their advertising and other agencies are not eligible. Odds of winning depend on number of eligible entries received. Winner must execute an affidavit of prize eligibility and consent to use of his/her name and/or likeness in advertising without compensation, unless prohibited by law.

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GREAT CARS. CHRYSLER CORPORATION

EXTRAS pp. 20-27



p. 20—**Goggles:** Mini Goggle, #89001, \$4.71; Sellstrom Mfg. Co., One Sellstrom Dr., Palatine, IL 60067; 800-323-7402. **Contractor's kit:** hard hat, suspenders, tool belt, with hammer, level, tape measure and flashlight, #893705, \$52; Woodworker's Supply, 5604 Alameda Place, NE, Albuquerque, NM 87113; 800-645-9292. **Youth Apron:** #67K7301, \$7.65; Lee Valley Tools Ltd., 12 East River St., Ogdensburg, NY 13669; 800-871-8158. **Traditional hand drill:** #28K04.01, \$35.25; Lee Valley Tools Ltd. **Saws:** Pro Coping Saw #10I17.01, \$10.25; Garrett Wade, 161 Ave. of the Americas, New York, NY 10013; 800-221-2943; 12-in. Compass Saw, #XT3150, \$20; Sandvik Saws & Tools Co., Hardware Division, Box 2036, Scranton, PA 18501-2036; 800-828-9893. **Hammers:** Lee Valley Hammer, #05E1201, 5 oz, \$8.95; Vaughan Little Pro, #79K02.01, 10 oz, \$15.75; Lee Valley Tools Ltd. **Spokeshave:** Stanley Light Flat-Face Spokeshave, #11P38.01, \$11.70; Garrett Wade. **RALImatic Swiss plane:** #123620, \$14; 12 replacement blades, #123592, \$7; Woodcraft, 210 Wood County Industrial Park, Box 1686, Parkersburg, WV 26102-1686; 800-535-4482. **Further reading:** *Woodworking for Kids*, by Kevin McGuire, 1994, 160 pp., \$15; Sterling Publishing Co., 387 Park Ave. So., New York, NY 10016; 800-848-1186. *Carpentry for Children*, by Lester Walker, 1982, 208 pp., \$14; *The Overlook Press*, 2568 Rte. 212, Woodstock, NY 12498; 914-679-6838.

p. 21—**Dubrovnik's Buy-a-Tile campaign:** Rebuild Dubrovnik Fund, 1804 Riggs Pl. NW, Washington, D.C. 20009; 800-738-4537 or 202-462-4883.

p. 22—**LIGHTscreen:** panels available in 18 colors, prices vary depending on intricacy, from \$40 per square foot; LIGHTscreen, RR1 Box 255, Johnson, VT 05656; 800-639-4351. **Enviro:** 3'x6' sheet, ½-in. thick, \$54.36; 3'x6' sheet, 1-in. thick, \$116; Phenix Biocomposites, Inc. Box 609, Mankato, MN 56002-0609; 800-324-8187. **Curvy trim:** Flex Trim Industries Inc., 11479 Sixth St., Rancho Cucamonga, CA 91730; 800-356-9060. **Flex Moulding Inc.:** 16 East Lafayette St., Hackensack, NJ 07601; 201-487-8080. **Resin Art:** 17 Continuum Dr., Fletcher, NC 28732; 704-687-0215. **Used Books:** \$12.50 per yard; Half-Price Books, 5915 E. Northwest Hwy., Dallas, TX 75231; 214-360-0833. **Rare-earth magnets:** #99K3101, .25"x.10", 75¢ each; #99K3103, .50"x.125", \$1.75 each; #99K3203, .375"x.10", 90¢ each; Lee Valley Tools Ltd., 12 East River St., Ogdensburg, NY 13669; 800-871-8158. **Further reading:** *Driving Force: The Natural Magic of Magnets*, by James D. Livingston, 1996, 311 pp., \$25; Harvard University Press, Cambridge, MA; 800-448-2242.

p. 23—**Mistakes book:** *Fixing and Avoiding Woodworking Mistakes*, by Sandor Nagyszalanczy, 1995, \$20; The Taunton Press, 63 South Main St., Box 5507, Newtown, CT 06470-5507; 800-888-8286. **Mister Miser Urinal:** 4901 N. 12th St., Quincy, IL 62301; 217-228-6900. **Roof venting:** Home Ventilation Institute, 31 W. University Dr., Arlington Heights, IL 60004-1893; 847-394-0150. American Society of Heating, Refrigerating & Air-Conditioning Engineers, 1791 Tullie Cir. NE, Atlanta, GA 30329; 404-636-8400. *Principles of Attic Ventilation*, 30 pp., \$3; Air Vent Inc., 4801 N. Prospect Rd., Peoria Heights, IL 61614.

p. 26—**LeveLite Pocket Lasers:** SL indoor unit #20082, two visible beams, \$429; SLX2 indoor/outdoor unit #20083, \$499; TriLite three-beam indoor/outdoor unit, #20689, \$699; SL Interior Pack, #20348, 4 lb., includes SL, quick-clamp, mag-clamp and ceiling mount, carrying pouch, targets, trivet, \$530; SLX2 Drywall Pack, #20790, 4 lb., includes SLX, drywall stand, mag-clamp and ceiling

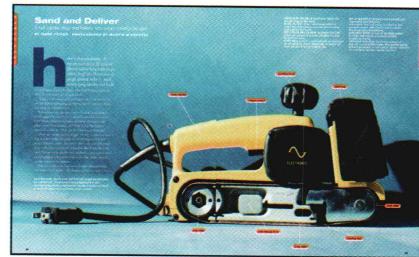
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EXTRAS continued

mount, carrying pouch, targets and trivet, \$570; SLX2 Contractor Pack, #20347, 4 lb., includes SLX, quick-clamp, mag-clamp and ceiling mount, carrying pouch, targets and trivet, \$600; Tri-Lite Drywall Pack, #0789, 4 lb., includes TriLite, drywall stand, mag-clamp and ceiling mount, carrying pouch, targets, \$750; Tri-Lite Contractor Pack, #20788, 4 lb., includes TriLite, quick-clamp, mag-clamp and ceiling mount, carrying pouch and targets, \$780; *LeveLite Technology Inc.*, 476 Ellis Street, Mountain View, CA 94043; 415-254-5980 or 800-453-8354. **On-Line Lumber:** "Woods of the World Standard" CD-ROM, \$30; *Tree Talk*, Box 426, Burlington, VT 05402; 800-858-6230. **Cogenerator:** Intelligen Energy Systems Inc., 98 South St., Hopkinton, MA 01748; 508-435-9007.

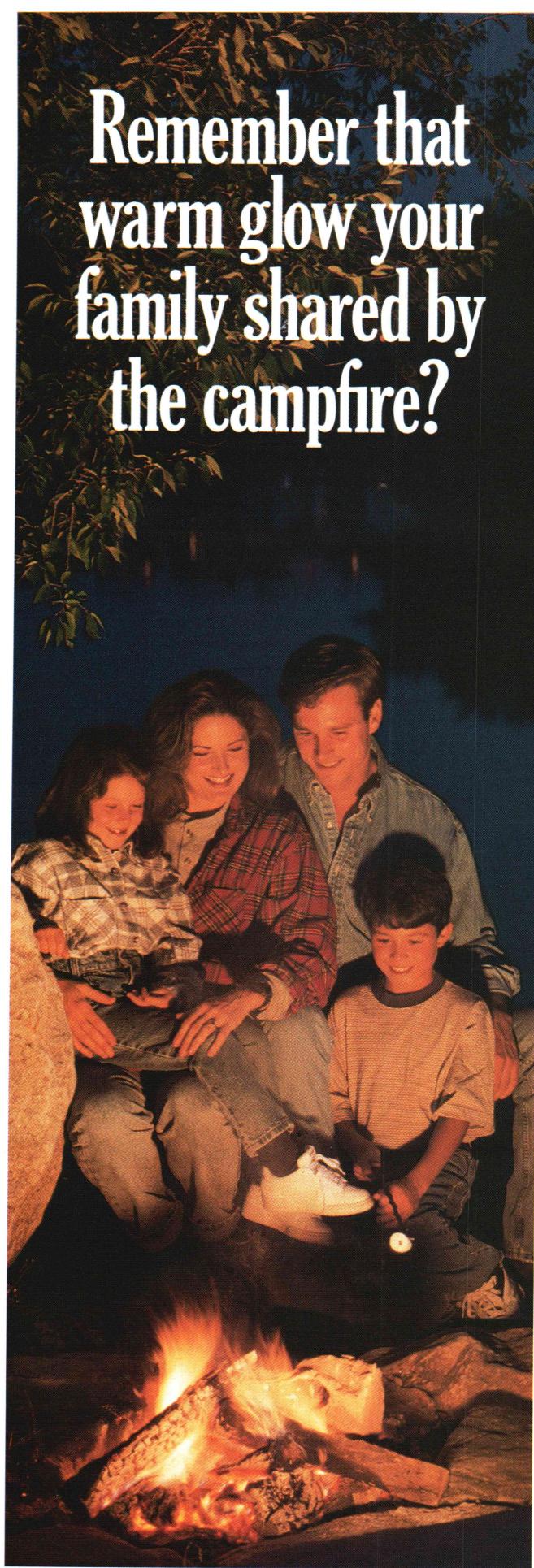
p. 27—Rust Buster: Sandflex blocks, 3"x2" x $\frac{3}{4}$ ", \$4; *Klingspor Corp.*, Box 5069, Hickory, NC 28603-5069; 704-326-9663. **Homewreckers' Club:** Murco Recycling Enterprises, Inc., 347 N. Kensington St., LaGrange Park, IL 60526; 708-352-4111. **Yellow Jacket extension cord with Lock-Jaw plug:** \$20-\$40; *Woods Industries*, 510 Third Ave. SW, Box 2675, Carmel, IN 46032-6675; 800-932-2636. **Shears:** Felco 7, \$45; *A.M. Leonard, Inc.*, 241 Fox Drive, Box 816, Piqua, OH 45356; 800-543-8955.

Our thanks to: Bill Rose, research architect, *Building Research Council, University of Illinois, Urbana-Champaign, IL.*; Anton TenWolde, research physicist, *Forest Products Laboratory, USDA Forest Service.*

BELT SANDERS pp. 28-34

Sanders: #DW431, 3"x21", \$338; *Dewalt Industrial Power Tools*, 626 Hanover Pike, Hampstead, MD 21074; 800-433-9258. #9031, 1 $\frac{1}{2}$ "x21", \$219-\$239; *Makita USA Inc.*, 14930 Northam St., La Mirada, CA 90638; 800-462-5482. #SB10T, 4"x24", \$423; *Hitachi Koki USA, Ltd.*, 3950 Steve Reynolds Blvd., Norcross, GA 30093; 800-706-7337. #362, 4"x24", \$245; *Porter-Cable*, 4825 Hwy. 45 N., Jackson, TN 38305; 800-321-9443. **Belt:** 80 grit bidirectional, #761, 3"x21", \$2.70; *3M, Construction & Home Improvement Markets*, 3M Center, 515-3N02, St. Paul, MN 55144; 800-854-4266. **Our thanks to:** Galen Fitzel, *3M Construction and Home Improvement*.

Remember that warm glow your family shared by the campfire?



Directory

DRYWALL pp. 37-42



Drywall: Jumbo baseboard, $\frac{1}{2}$ "x4'x8", \$4.50; Celotex, 4010 Boy Scout Blvd., Tampa, FL 33607; 813-873-1700. Dens-Glass Gold exterior sheathing, $\frac{3}{4}$ "x4'x8", \$11; Georgia-Pacific, Gypsum Div., 133 Peachtree St. NE, Atlanta, GA 30303; 313-225-6119. Ultra-Code Core, fire-resistant, $\frac{3}{4}$ "x4'x8", \$13; US Gypsum Co., 125 S. Franklin St., Box 806278, Chicago, IL 60680-4124; 800-851-8501. Embossed Raised Panel, \$2 per sq. ft.; Pittcon Industries Inc., 6490 Rhode Island Ave., Riverdale, MD 20737; 301-927-1000. Gyproc Moisture-Guard, $\frac{3}{4}$ "x4'x8", \$6-\$7; Georgia-Pacific Gypsum Div. Foil-Back vapor barrier, $\frac{3}{4}$ "x4'x8", \$9; National Gypsum Co., Gold Bond Building Products, 2001

Rexford Rd., Charlotte, NC 28211; 704-365-7300. VHI Fiber Bond, impact-resistant, $\frac{3}{8}$ "x4'x8", \$20; Louisiana Pacific Corp., 111 SW 5th Ave., Portland, OR 97204-3601; 503-221-0800. Lexan 2000, impact-resistant, $\frac{3}{8}$ "x4'x8", \$32; National Gypsum Co. Drywall recyclers: Dana Wallboard Supply Inc., 6 Cummings Road, Tyngsborough, MA 01879; 508-649-4000. For further reading: Twentieth Century Building Materials, ed. by Thomas C. Jester, 1995, 352 pp., \$55; McGraw Hill Co., 1221 Ave. of the Americas, New York, NY 10020; 800-722-4726. Our thanks to: The Gypsum Association, 810 First St. NE, #510, Washington, D.C. 20002; 202-289-5440. Helen Gonzalez, Celotex. George Shortreed, Georgia-Pacific, Gypsum Div. Barry Lacter, Louisiana Pacific Corp. Valerie McRorie, National Gypsum Co. Glenn Whiteman, US Gypsum Co.

HACKSAWS pp. 44-48



Hacksaws: High-tension #15-113, \$20; Stanley Tools, 600 Myrtle St., New Britain, CT 06053; 800-262-2161. Supreme with top-mounted tensioning system, #EH-50, \$17.50; Estwing Manufacturing Co., 2647 Eighth St., Rockford, IL 61109-1190; 815-397-9558. Lenox mini-hacksaw, #975, \$8.50; American Saw & Manufacturing Co., Tool Div., 301 Chestnut St., E. Longmeadow, MA 01028; 800-628-3030. 6-in. Pistol-grip, #268, \$12; Sandvik Saws & Tools Co., 19 Keystone Industrial Park, Box 2036, Scranton, PA 18501-2036; 800-828-9893. Lenox hacksaw frame #2012, \$5; American Saw & Manufacturing Co., Tool Div. Blades: Lenox 10-in. bimetal-hacksaw,

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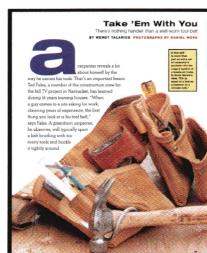
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HACKSAWS continued

#018-HE, 18 teeth per inch, \$1.50; *American Saw & Manufacturing Co.*, Tool Div. Sandflex 12-in. bimetal, #3806, 24 tpi, \$2; *Sandvik Saws & Tools Co.* Lenox 10-in. bimetal-hacksaw, #032-HE, 32 tpi, \$1.50; *American Saw & Manufacturing Co.*, Tool Div. RemGrit 10-in. tungsten carbide rod-saw, \$3; 12-in., \$4; RemGrit 10-in. tungsten carbide hacksaw, \$4; 12-in., \$4.50; *Greenfield Industries*, Disston Div., Deerfield Industrial Park, S. Deerfield, MA 01373; 800-446-8890.

Our thanks to: Hack & Band Saw Manufacturers Association of America, 1300 Summer Ave., Cleveland, OH 44115-2851; 216-241-7333.

TOOL BELTS pp. 59-62



Framer's belt: Deluxe set #1C-55, \$130; *Diamond Back USA*, Box 347179, 1121 Silliman St., San Francisco, CA 94134; 800-899-2358. **Electrician's belt:** Tie-wire leather belt, #5420, 2 in. wide, 36- to 44-in. waist, \$27; 6-pocket leather, #5127, fits belts up to 2 in. wide (models available to fit belts up to 2½ in.), \$24; *Klein Tools, Inc.*, 7200 McCormick Blvd., Box

599033, Chicago, IL 60659-9033; 847-677-9500. **Finish carpenter's belt:** Leather Jural B-283, \$47; *Garrett Wade Co.*, 161 Ave. of the Americas, New York, NY 10013; 800-221-2942. **Nylon-web suspenders:** #60209R (red) with adjustable leather back-spreader, \$11; *Klein Tools Inc.* **Roofer's belt:** Polypropylene web belt #5225, 2½ in. wide, adjusts from 32- to 48-in. waist, \$7; 6-pocket leather nail, screw and tool holder, #42241, fits belts up to 3 in. wide, \$22; Leather hammer holder, #5456TS, fits belts up to 4 in. wide, \$11; *Klein Tools Inc.* **Customized belt:** 4-pocket leather #5118C, fits belts up to 2 in. wide, \$39; 6-pocket leather #5168, fits belts up to 2 in. wide, \$29; 11-pocket leather #5167, fits belts up to 2½ in. wide, \$53; *Klein Tools Inc.*

Our thanks to: McGuire Nicholas Co., 2331 Tubeway Ave., City of Commerce, CA 90040; 800-367-6425.

HOLIDAY LIGHTS pp. 65-69



Outdoor Light Set: multicolor ceramic or clear C-9 bulbs (as shown on p. 65), \$16; **Jewel Light Set:** multicolor or clear, \$25; **Pearl Lights:** multicolor or clear, \$25; **Lighted Ice Set:** multicolor (sugar-coated) C-7, \$20; **Clear Miniature Light Set:** (100 per string), \$15; **Colorbright Jewel Tone Series:** transparent violet, green, blue, red or multicolor C-7½ bulbs, \$15; *Just Bulbs Ltd.*, The Light Bulb Store, 936 Broadway, New York, NY 10010-6063; 212-228-7820.

For more information: National Ornament & Electric Lights Christmas Association, 236 Route 38 West, Suite 100, Moorestown, NJ 08057; 609-231-8500.

Our thanks to: Harris Taormina, Mark Christofi and Mark Selfridge, Kelly Blazek and Kathy Presciano, GE Lighting; Judi Brooks Kraft, Just Bulbs Ltd.

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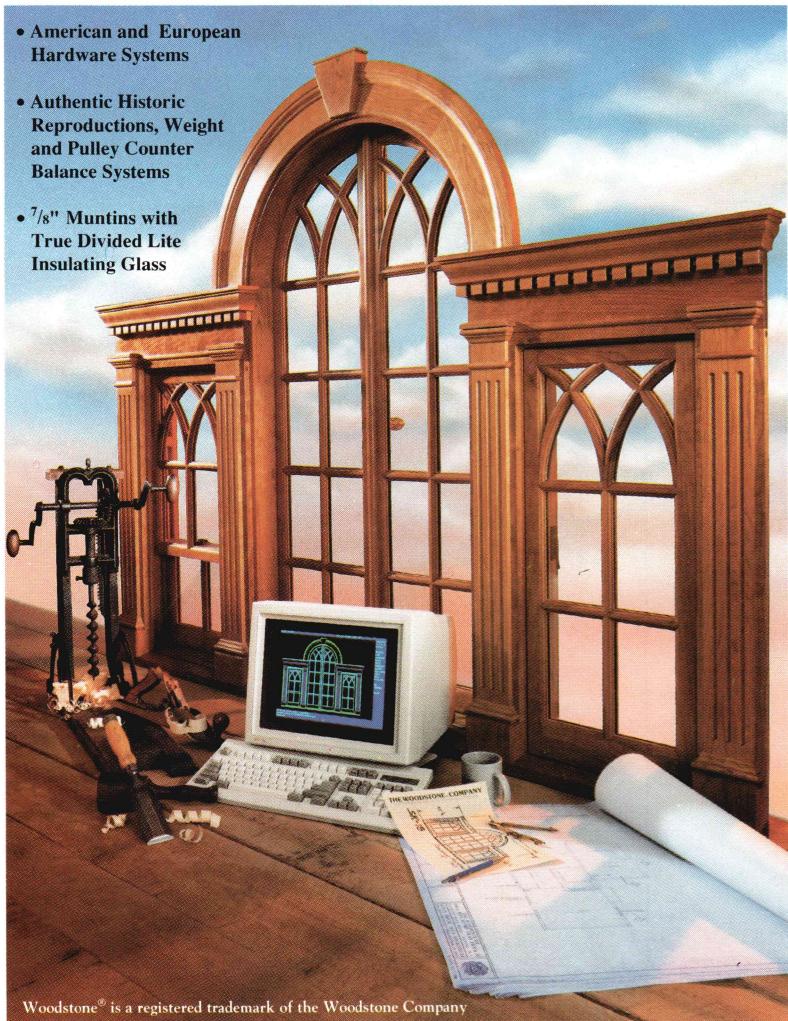


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PROTECTION MONEY pp. 71-72



For more information: American Home Shield, 860 Ridge Lake Blvd., Memphis, TN 38120; 800-247-1644. National Home Warranty Association, 20 Ellerman Road, Lake St. Louis, MO 66675; 800-325-8144. ERA Franchise Systems Inc., 6 Sylvan Way, Parsippany, NJ 07054; 201-428-9700. Guaranteed Homes Inc., 20 Ellerman Road, Lake St. Louis, MO 63367; 800-325-8144. Home Protection One Corp., 30785 Grand River, Farmington Hills, MI 48336; 800-662-4221.

Our thanks to: Ted and Sharon Shafer, Keith Hammonds, Stephen Krause, Gail Hillebrand, Joe Fiorella and John Kinker.

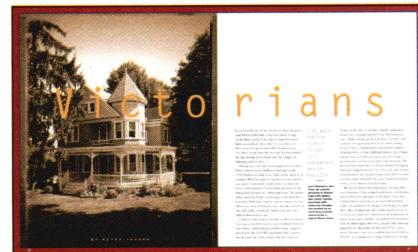
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NANTUCKET UPDATE pp. 78-85



John F. Gifford, Design Associates; 15 Main St., Nantucket, MA 02554; 508-228-4342. Bruce Killen, contractor; 36½ Cliff Rd., Nantucket, MA 02554; 508-228-1485. Nantucket Historic District Commission: 37 Washington St., Nantucket, MA 02554; 508-228-7231.

VICTORIANS pp. 86-95



For more information: The National Trust for Historic Preservation, 1785 Massachusetts Ave., NW, Washington, D.C. 20036; 202-588-6000. The Victorian Society In America, 219 South Sixth St., Philadelphia, PA 19106; 215-627-4252. Artistic License, A Guild of Artisans, Box 881841, San Francisco, CA 94188; 415-675-9996. The Foundation for San Francisco's Architectural Heritage, tours available; *The Haas-Lilienthal House*, 2007 Franklin St., San Francisco, CA 94109; 415-441-3000. The Victorian Alliance, 824 Grove St., San Francisco, CA 94117; 415-824-2666. Further reading: *In the Victorian Style*, by Randolph Delehanty, 1991, 192 pp., \$35; *Chronicle Books*, 275 Fifth St., San Francisco, CA 94103; 800-722-6657. *The American Family Home, 1800-1960*, by Clifford E. Clark Jr., 1986, 281 pp., \$20; *The University of North Carolina Press*, Box 2288, Chapel Hill, NC 27515 800-848-6224. *American House Styles, A Concise Guide*, by John M. Baker, 1993, 190

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VICTORIANS continued

pp., \$20; W.W. Norton & Co., Inc., 500 Fifth Ave., New York, NY 10110; 800-233-4830. *What Style Is It? A Guide to American Architecture*, by John C. Poppeliers, 1983, 112 pp., \$9; John Wiley & Sons, Inc., 605 Third Ave., New York, NY 10158; 800-225-5945. *Home: A Short History of an Idea*, by Witold Rybczynski, 1987, 256 pp., \$13; Penguin USA, 375 Hudson Street, New York, NY 10014.

Our thanks to: Lucinda Eddy, associate director & curator, Museums of San Diego History, Box 81825, San Diego, CA 92138; 619-232-6203. Chris Ackerman, A.I.A., 749 Olive Ave., Coronado, CA 92118; 619-232-7605. Tom Wolf, Ohio Historic Preservation Office, 567 E Hudson St., Columbus, OH 43211; 614-297-2470. Beth Fisher, The Ohio Arts Council, 727 E. Main St., Columbus, OH 43205; 614-466-2613. Vikki Powers, president, and Richard Reutlinger, treasurer, *The Victorian Alliance*. Joan Berkowitz and Mary Jablonski, Jablonski-Berkowitz Conservation Inc., 580 Broadway, New York, NY 10012; 212-343-2970.

KITCHENS pp. 96-101



Rope molding: Woodmode, One Second St., Kramer, PA 17833; 717-374-2711. **Pendant lights:** #555-D, \$350; Brass Light Gallery, 131 S. First St., Milwaukee, WI 53204; 800-243-9595. **Ranges:** Jenn-Air under the counter, #W30100, \$942; Jenn-Air full stainless-steel downdraft range, #SUD8310S, \$2,555; Jenn-Air Corp.,

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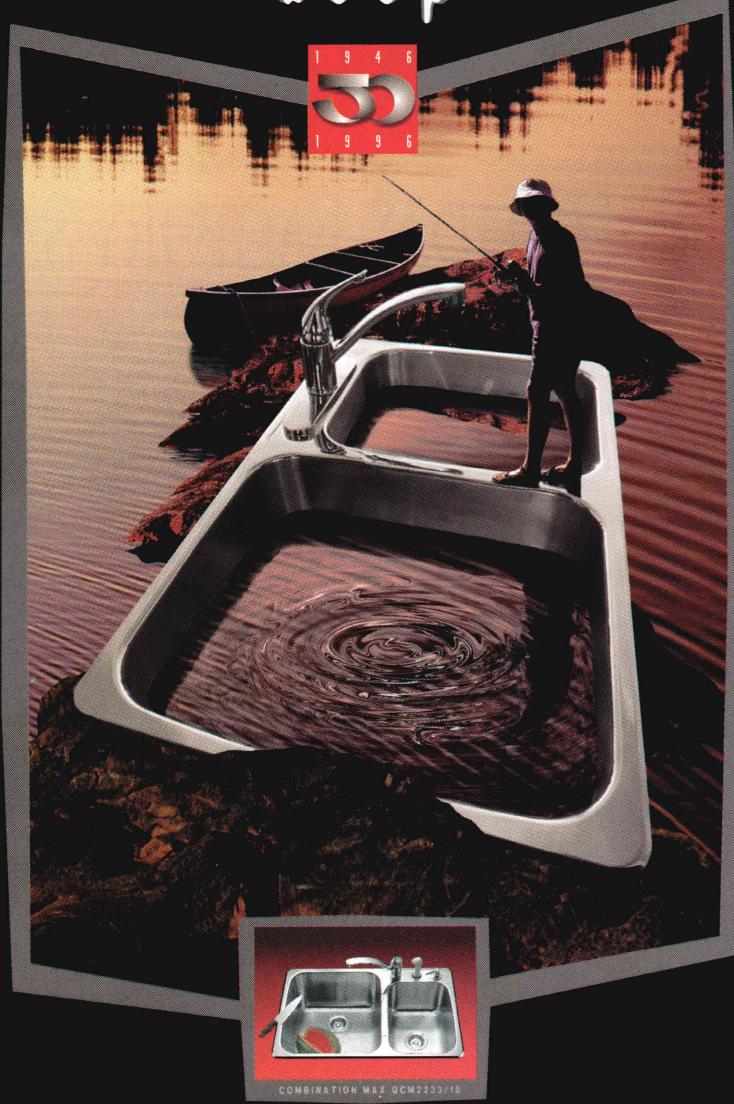
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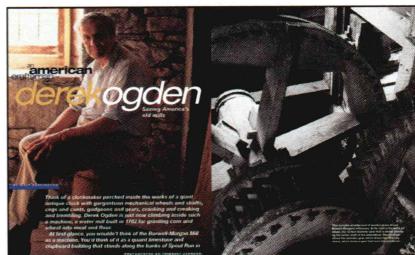
KITCHENS *continued*

303J N. Shadeland Ave., Indianapolis, IN 46226; 800-536-6247. Sink: Kohler stainless-steel double-bowl, #K3224, \$589; Kohler Co., 444 Highland Drive, Kohler, WI 53044; 800-456-4537. Refrigerator: Jenn-Air, #JRS2490T, \$1,918; Jenn-Air. Dishwasher: Jenn-Air, DW860V2B, \$662; Jenn-Air.

Our thanks to: Gina MacVicar, Marine Home Center, Kitchen & Bath Shop, Lower Orange St., Nantucket, MA 02554; 508-228-0900. Melissa Guenet-Zagorites, Lighting Designer, ArcLight, 221 Main St., Nashua, NH 03060.

For further reading: *This Old House Kitchens*, by Steve Thomas and Philip Langdon, 1992, 273 pp., \$25; Little, Brown & Co., 34 Beacon St., Boston, MA 02108; 800-759-0190. *Complete Book of Kitchen Design*, by Ellen Rand and Florence Perchuk, 1991, 216 pp., \$17; Consumer Reports Books, 101 Truman Ave., Yonkers, NY 10703; 914-378-2000.

AMERICAN CRAFTSMAN pp. 102-109



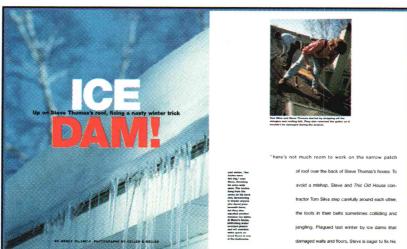
Mill Restoration: Derek Ogden, millwright, HCR 5, Box 339, Madison, VA 22727; 540-672-1303.

Further reading: *The Young Millwright and Miller's Guide*, by Oliver Evans, 1990 edition, 472 pp., \$20; *The Mill Bookstore*, Box 1055, Newton, NC 28658; 704-465-0383. *Old Mill News*, one-year subscription (four issues), \$17.50, includes membership in *The Society for the Preservation of Old Mills*, Box 5, Hartford, NY 12838; 518-632-5237.

Our thanks to: The Burwell-Morgan Mill and volunteer workers H. Baker, Joe Guenther and John Lincoln, Millwood, VA 22646; 540-837-1799.

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ICE DAM pp. 110-115



Self-adhesive membrane: Grace Ice and Water Shield, \$85-
\$100 per 36"x75' roll; *Grace Construction Products*, 429 Jumbers Hole Rd., Suite 301, Severna Park, MD 21146; 800-472-2365. **Cedar breather:** Nylon matrix, \$80-\$95 per 200-sq.-ft. roll; *Benjamin Obdyke Inc.*, 65 Steamboat Dr., Warminster, PA 18974; 800-346-7655.

Our thanks to: Bill Rose, Building Research Council, University of Illinois at Urbana-Champaign; 800-336-0616. Wayne Tobiasson, US Army Corps of Engineers; *Cold Regions Research & Engineering Lab*, 72 Lyme Rd., Hanover, NH 03755-1290; 603-646-4100. Paul Fisette, director, *Building Materials Technology & Management Program*, University of Massachusetts; UM, Amherst, MA; 413-545-1771.

OIL TANKS



0609. NDE Environmental Corporation, 8900 Shoal Creek Blvd., Austin, TX 78757; 800-800-4633. **Further reading:** *Money-Saving Strategies for Underground Storage Tank Removal, Closure, and Remediation*, 20 pp., \$7, (includes postage and handling); *Environmental Strategies & Applications Inc.*, 347 Elizabeth Ave., Suite 100, Somerset, NJ 08873; 908-

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Highland Tank & Manufacturing Company, 99 West Elizabethtown Rd., Manheim, PA 17545; 717-664-

0609. NDE Environmental Corporation, 8900 Shoal Creek Blvd., Austin, TX 78757; 800-800-4633. **Further reading:** *Money-Saving Strategies for Underground Storage Tank Removal, Closure, and Remediation*, 20 pp., \$7, (includes postage and handling); *Environmental Strategies & Applications Inc.*, 347 Elizabeth Ave., Suite 100, Somerset, NJ 08873; 908-

469-8888. California's Leaking Underground Fuel Tank Historical Case Analyses, #UCRL-AR-122207 and Recommendations to Improve the Cleanup Process for California's Leaking Underground Fuel Tanks, #UCRL-AR-121762, by Lawrence Livermore National Laboratory and the University of California, free; fax request to Rachel Horsley at California Water Resources Board, Sacramento, CA; 916-227-4349.

Our thanks to: Paul Geiger, editor, *Fuel Oil and Oil Heat*, *Fairfield, NJ*. Tom Sparks, *Toxics Assessment Group*, *Davis, CA*. Noel de Nevers, professor of Chemical and Fuels Engineering, *University of Utah, Salt Lake City, UT*. Grant Ferrier, president, *Environmental Business International*, *San Diego, CA*. Lt. Bob Bourke, *Lynn Fire Dept., Lynn, MA*. Fred Sacco, executive director, *Fuel Oil Merchants Association of NJ*, *Springfield, NJ*. Jay Evans, *Office of Underground Storage Tanks*, *EPA Washington, D.C.*

Directory

A DOOR IN NANTUCKET pp. 122-129



Etched glass: Lehmann Glass Studio; 1793 12th Street, Oakland, CA 94607; 510-465-7158.

Our thanks to: Nantucket Historical Association, Two Whalers Lane, Box 1016, Nantucket, MA, 02554; 508-228-1894. Historic District Commission, 37 Washington St., Nantucket, MA, 02554; 508-228-7231.

LIFE WITH BAMBI pp. 134-138



Deer fences: Polypropylene fence, 7'x100', \$95; Benner's Gardens, 6974 Upper York Rd., New Hope, PA, 18938; 800-753-4660. Deer-block protective mesh fence, #6052, 7'x100', \$19; Easy Gardener, Box 21025, Waco, TX, 76702-1025; 800-327-9462. Nonelectric deer netting, #DEE-8000, 8'x330', \$215; Deerbusters, 9735A Bethel Rd., Frederick, MD 21702-2017, 800-248-3337.
Repellents: Deerbuster's Own Deer Repellent, #DEE-1080, 32-oz. ready-to-use spray, \$20; Plant Growth Stimulant, #DEE-1095, 32-oz. ready-to-use spray, \$20; Tree Guard, #DEE-2006, 32-oz

ready-to-use spray, \$20; Foam Darts, #DEE-2056, 18 darts, \$3; Deer Drops, #DEE-6025, 2 oz. (3-month supply), \$6; Coyote Urine Lure, #DEE-2055, 32-oz. bottle, \$30; Deer Pops, #DEE-6001, 24 baits, \$24; Sachets, #DEE-1010, 12 sachets, \$15; Hinder #DEE-0900, 1 gal., \$30; Repel Animal Repellent, #DEE-1086, 32-oz. spray bottle, \$15; *How to Grow Your Deer-Free Vegetable Garden without a Fence*, #DEE-9090, video includes home-recipe, \$20; Sensor-controlled Super Sprayer, #DEE-4015, \$129; Motion-activated ultra-sonic warning device, #DEE-4020, \$180; Motion-activated sonic warning device, #DEE-4050, \$80; Deer night light, #DEE-6050, \$30; Underground dog fence, #PET-3010, \$350; Deerbusters, 9735A Bethel Rd., Frederick, MD 21702-2017, 800-248-3337; <http://www.deerbusters.com>.
Tree Protection: Burlap, #3103, 3'x150', \$49; Tree Wrap polyethylene fiber, #503, 4"x20', \$4; *Easy Gardener*, Box 21025,

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LIFE WITH BAMBI continued

Waco, TX 76702-1025; 800-327-9462. Accessories: Tick Nipper, #DEE-2060, \$8; Deer Busters hat, #DEE-9000, \$6.50; Deer Busters bumper sticker, #DEE-9060, \$1.50; *Deerbusters*, 9735A Bethel Rd., Frederick, MD 21702-2017; 800-248-3337.

Further reading: *Reducing Deer Damage to Home Gardens and Landscape Plantings*, #147DP, booklet, \$3.50; *Resistance of Woody Ornamental Plants to Deer Damage*, #147HGGFS800 fact sheet, \$1; Cornell University, Media Services Resource Center, 7-8 Business and Technology Park, Ithaca, NY 14850; 607-255-7660. *Gardening in Deer Country*, by Karen Jescavage-Bernard, \$7.75; Karen Jescavage-Bernard, 529 East Quaker Bridge Rd., Croton-on-Hudson, NY 10529; 914-271-2623. *The Deer Browse Garden and Year-End Report*, free pamphlet; send SASE to The Institute of Ecosystem Studies, Gifford House, Box R, Millbrook, NY 12545-0129; visitors welcome, for hours call 914-677-5359.

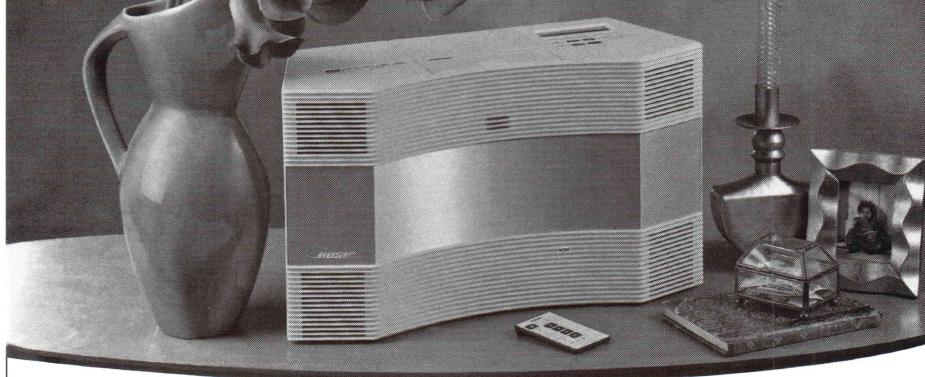
Our thanks to: Jason E. Wiles, general manager, *Deerbusters*, 9735A Bethel Rd., Frederick, MD 21702-2017, 800-248-3337.

COLD FRAME pp. 140-141



Covering: TwinWall insulated glazing panel #1272, 2'x2', \$12; sizes up to 2'x6', \$36; *Charley's Greenhouse Supply*, 1569 Memorial Highway, Mount Vernon, WA 98273; 800-322-4707. **Tape:** 3M vent tape, #394, 1½" x 36 yds, \$13.85; *Griffin Greenhouse Supplies Inc.*, Box 36, Tewksbury, MA 01876-0036; 508-851-4346. Aluminum tape #1503, 2" x 100' per roll, \$13.95; *Charley's Greenhouse Supply*. **Vent openers:** Bayliss MK7 solar-powered vent control, #3507, \$56; *Charley's Greenhouse Supply*.

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PRIVET HEDGE pp. 142-144



Our thanks to: Marty McGowan, Sconset Gardener, 88 Somerset Road, Nantucket, MA 02554; 508-228-3422. Rosedale Nursery, 51 Saw Mill River Rd., Hawthorne, NY 10532; 914-769-1300. Crisse MacFadyen Genga at Green Animals (open May-Oct. from 10 am-5 pm, admission \$6.50 for adults, \$3 for children ages 6-11); 380 Cory's Lane, Portsmouth, RI 02871; 401-683-1267. **For more information:** "All That Glitters," *American Horticulturist*, March 8, 1995, pages 7-10; 703-768-5700.

SAVE THIS OLD HOUSE p. 176



Our thanks to: Peggy Parker, broker/owner, *Peggy Parker Real Estate*, and Erma Runion, associate broker, *Mody Real Estate*.

PRICES SHOWN ARE MANUFACTURERS' SUGGESTED RETAIL PRICES AT PRESS TIME OR THE AMOUNT *THIS OLD HOUSE* ACTUALLY PAID AT RETAIL. PRICES, PRODUCT NUMBERS AND AVAILABILITY MAY CHANGE AT ANY TIME.



Homeowners Lynn and Barbara Wickwire contributed sweat equity to the project by putting up insulation in the basement and staining the barn-red clapboards—all 90 boxes of them.

Week 7

(November 2-3) The timbers are stacked, reporters are on the scene—the barn raising is about to begin. The frame goes up quickly, piece by piece, with shouts and applause from the volunteer crew after each successful lift. By day's end, under threatening skies, workers hammer the last of the pegs and braces that lock the structure together. As rain begins to fall, homeowner Lynn Wickwire brings

the project to a symbolic close by driving in a pair of pegs salvaged from the original barn.

Week 8

(November 9-10) The build-out begins with the installation of the stress-skin insulated wall panels. At the edge of the property, workers start drilling for a well, boring down more than 70 feet to bedrock. Once through the bedrock, they keep

going...and going. The good news: At 405 feet, they hit a "fracture zone" and draw water. The bad news: It's only a trickle and it's laden with iron. So they keep drilling....

Week 9

(November 16-17) The barn may look old-fashioned, but many of its systems and materials are thoroughly modern, such as the motorized skylights Norm Abram and Tom Silva install: They open automatically when it gets too hot inside and close at the first drops of rain. Outside, Tom Wirth, *This Old House*'s landscape designer, begins planning the yard and garden areas. In another nod to the barn that was, the stone terrace will include a granite bench made from the old building's doorsill.

Week 10

(November 23-24) It's fall in New England and time to think about heating. Plumbing and heating contractor Richard Trethewey explains the radiant-floor system that will heat the barn's three-story great room. Polyethylene tubing is snaked in loops across the subfloor, then covered with lightweight concrete. With a steady supply of hot water running through the loops, the family will walk on warm floors all winter.

Week 11

(November 30-December 1) "Count Rockula"—a.k.a. stonemason Roger Hopkins—shows Steve Thomas how to split hunks of Vermont granite using hand tools. The slabs will be used as steps leading up to the patio. Inside, Norm is busy remilling pine boards saved from the old barn to make a pair of pocket doors. From the well-drillers comes good news: They hit a strong supply of clean water at 445 feet.

Week 12

(December 7-8) The interior begins to take shape as owner Barbara Wickwire settles on a kitchen design. Among her choices, she decides against the standard 36-inch counter height, going instead with 37½ inches so husband Lynn's back won't ache when he bakes bread or does the dishes. Outside, Steve and Roger make the capstone for the stone wall from a large block of granite.

Week 13

(December 14-15) It's the coldest day of the year, just 10 degrees, and landscape contractor Roger Cook arrives with a truckload of plantings. To complete the outdoor work, the crew lays brick for a pathway and builds a fence with hand-peeled logs. In the basement, the Wickwires contribute sweat equity by putting insulation into the ceiling bays. With much of the work finished—but a lot still to be done—it's time for a budget check. Will the project stay on its \$225,000 target?

Week 14

(December 21-22) With its tight construction and thick insulation, the barn suffers from the opposite problem of most houses: It's too energy efficient. That's why Richard Trethewey chose radiant-floor heating for the great room. With forced-air heat, the upstairs would be sweltering by the time the ground floor reached 68 degrees. To preview the powerful boiler needed to run the radiant-floor system, Trethewey visits the factory near Frankfurt, Germany, and gets a look at the high-tech machinery used to build it.

Coming Next Issue

(December 28-29) Steve goes ice-boating and visits the factory where the barn's staircase was made.

This Old House Classics are vintage episodes that can now be seen every week on these stations around the nation.

ALABAMA

Birmingham
WNAL-TV* (Ch. 44)

ALASKA

Anchorage
KIMO-TV (Ch. 3)
Sat. 5:30pm
Sun. 6:30am

Fairbanks

KATN-TV (Ch. 2)
Sat. 5:30pm
Sun. 6:30am

Juneau

KJUD-TV (Ch. 8)
Sat. 5:30pm
Sun. 6:30am

ARIZONA

Phoenix
KPHO-TV (Ch. 5)
Sat. 10am
Tucson
KTTU-TV (Ch. 18)
Sat. 9am

CALIFORNIA

Chico
KRCR-TV (Ch. 7)
Sun. 5pm

Eureka

KAEF-TV (Ch. 23)
Sun. 5pm

Fresno

KJEO-TV* (Ch. 47)
Los Angeles
KABC-TV (Ch. 7)

Monterey/Salinas

KCCN-TV (Ch. 46)
Sun. 10:30am

Sacramento/Stockton/ Modesto

KPWB-TV (Ch. 31)

San Diego

KGTV-TV (Ch. 10)
Sat. 5pm

San Francisco/Oakland

KPIX-TV (Ch. 5)
Sun. 10am

Santa Barbara/ Santa Maria

KSBY-TV (Ch. 6)
Sun. 3pm

COLORADO

Colorado Springs/Pueblo
KRDO-TV (Ch. 13)
Sun. 11:30am

Denver

KCNC-TV (Ch. 4)
Sun. 10:30am

Grand Junction

KJCT-TV (Ch. 8)
Sun. 11:30am

CONNECTICUT

Hartford/New Haven
WFSB-TV (Ch. 3)

Sun. 12:30pm

DISTRICT OF COLUMBIA

WUSA-TV (Ch. 9)
Sat. 6am

FLORIDA

Fort Myers/Naples
WTVK-TV (Ch. 46)

Sat. 11:30am

Jacksonville

WTLV-TV (Ch. 12)
Sat. 7:30am

Miami/Ft. Lauderdale

WPLG-TV (Ch. 10)
Sun. 8:30am

Orlando/Daytona Beach

WFTV-TV (Ch. 9)
Sat. 5am

Sarasota

WWBS-TV (Ch. 40)
Sun. 11:30am

CONNECTICUT

WFSB-TV (Ch. 3)
Sun. 12:30pm

HAWAII

WFTV-TV (Ch. 28)
Sun. 10am

Tampa

WPEC-TV (Ch. 12)
Sun. 11am

West Palm Beach

WPEC-TV (Ch. 12)
Sun. 11am

GEORGIA

Albany
WGVP-TV (Ch. 44)

Sat. 10:30am

Atlanta

WXIA-TV (Ch. 10)
Sun. 6:30am

Macon

WMAZ-TV (Ch. 13)
Sat. 11am

Savannah

WTOC-TV (Ch. 11)
Sun. 5pm

HONOLULU

KHNL-TV (Ch. 13)
Sat. 4:30pm

Boise

KIVI-TV (Ch. 6)
Sun. 10:30am

ILLINOIS

Champaign/Springfield
WICS-TV (Ch. 20)

Sat. 7:30am

Chicago

WBBM-TV (Ch. 2)
Sun. 11am

Rockford

WTVW-TV (Ch. 17)
Sat. 6pm

INDIANA

Evansville
WTVW-TV (Ch. 7)
Sun. 9:30am

Indianapolis

WNDY-TV (Ch. 23)
Sat. 11:30am

South Bend

WHME-TV (Ch. 46)
Sat. 1:30pm

IOWA

Cedar Rapids
KWWL-TV* (Ch. 7)

What Norm Abram remembers most is what he missed

Norm had only one complaint about the Concord barn raising: He wasn't there. "In the 18 years that I've been doing the show, I can only remember two, maybe three shows that were filmed on a Saturday, and this was one of them." He had an appearance booked a year in advance. "I ended up missing the big event. But when I got back from the trip," he says, "I didn't go home. I went straight to Concord and walked around the frame. I only fully realized what it was like when I saw the tape of the show."

He remembers Concord as one of the crew's more challenging—and disappointing—projects. "We were so hopeful in the beginning that we could actually save the existing frame and create a new living space. As we got deeper into it, we saw that it was hopeless." Then as now, it was Norm's job to deliver the bad news. In this case, he had a new listener: host Steve Thomas, making his *This Old House* debut.

"Steve's role was to be the optimist and think there was something there [to be saved]," Norm recalls. "Mine was to be the realist and knock him down a couple of steps. He would say, 'This is a history of timber framing.' I'd say, 'That's not right, this is a history of repairs.'" Their "friendly banter" came easily, Norm says. "Being that it was Steve's first series, he came into the role pretty smoothly. I think he fit in with the rest of the group." His first piece of advice to the new cast member? "Something it took me a long time to learn: It takes a lot of concentration to do the show."

Ottumwa/Kirksville
KYUO-TV (Ch. 15)
Sat. 2:30pm

KANSAS
Wichita
KSNW-TV (Ch. 3)
Sun. 6:30am

KENTUCKY
Bowling Green
WBKO-TV (Ch. 13)
Sun. 6:30am
Lexington
WTVO-TV (Ch. 36)
Thu. noon

Louisville
WHAS-TV (Ch. 11)
Sat. 6:30am
Paducah
KBSI-TV (Ch. 23)
Sat. noon

LOUISIANA
Baton Rouge
WAFB-TV (Ch. 9)
Sun. noon

New Orleans
WVUE-TV (Ch. 8)
Sun. 6am
Shreveport
KTBS-TV (Ch. 3)
Sun. 6am

MAINE
Bangor
WVII-TV (Ch. 7)
Sun. noon
Portland/Auburn
WPXT-TV (Ch. 51)
Sun. 10am

MARYLAND
Baltimore
WMAR-TV (Ch. 2)
Sun. 11am

MASSACHUSETTS
Boston
WFXT-TV (Ch. 25)
Sun. 2pm

MICHIGAN
Detroit
WDIV-TV* (Ch. 4)
Sun. 7am
Flint/Saginaw/Bay City
WNEM-TV (Ch. 5)
Sun. 5am
Grand Rapids/
Kalamazoo/Battle Creek
WOOD-TV* (Ch. 8)
WOTV-TV* (Ch. 41)
Traverse City/Cadillac
WWTV-TV (Ch. 9)
Sun. 10:30am
WWUP-TV (Ch. 10)
Sun. 10:30am

MINNESOTA
Minneapolis/St. Paul
KSTP-TV (Ch. 5)
Sun. 10am

Rochester/Austin
KAAL-TV (Ch. 6)
Sat. 6pm

MISSISSIPPI
Columbus/Tupelo
WCBI-TV (Ch. 4)
Sun. 5pm
Jackson
WLBT-TV (Ch. 3)
Sun. 6:30am

MISSOURI
Columbia/Jefferson City
KRCG-TV (Ch. 13)
Sun. 10am

Kansas City
KMBC-TV (Ch. 9)
Sat. 6am

NEBRASKA
Lincoln/Hastings
KHAS-TV (Ch. 5)
Sat. 5pm

Omaha
KETV-TV (Ch. 7)
Sat. 12:30pm

NEVADA
Las Vegas
KTNV-TV* (Ch. 13)
Reno
KREN-TV* (Ch. 27)

NEW MEXICO
Albuquerque/Sante Fe
KOB-TV (Ch. 4)
Sat. 4pm

NEW YORK
Albany
WXXA-TV (Ch. 23)
Sun. 8am

Binghamton
WBNG-TV (Ch. 12)
Sat. 7:30am

Buffalo
WIVB-TV* (Ch. 4)
New York
WCBS-TV (Ch. 2)
Sun. 7:30am

Syracuse
WTVH-TV (Ch. 5)
Sun. 11:30am

Watertown
WWNY-TV (Ch. 7)
Sat. 7:30am

NORTH CAROLINA
Charlotte
WBTV-TV (Ch. 3)
Sun. 1:30pm

GREENSBORO/WINSTON-SALEM
WGHP-TV (Ch. 8)
Sun. 8am

GREENVILLE/SPARTANBURG/ASHEVILLE
WLOS-TV* (Ch. 13)
WFBC-TV* (Ch. 40)
Raleigh/Durham
WTVD-TV (Ch. 11)
Sun. 10am

OHIO
Cincinnati
WCPO-TV (Ch. 9)
Sun. 6am

CLEVELAND
WEWS-TV (Ch. 5)
Sat. 4:30am

COLUMBUS
WSYX-TV* (Ch. 6)
Dayton
WRGT-TV (Ch. 45)

TOLEDO
WTVG-TV (Ch. 13)
Sun. 9:30am

WHEELING/STEUBENVILLE
WTRF-TV* (Ch. 7)
Youngstown
WFMJ-TV (Ch. 21)

OKLAHOMA
Oklahoma City
KOCO-TV (Ch. 5)
Sat. 10am

TULSA
KJRH-TV (Ch. 2)
Sat. 10:30am

OREGON
Eugene
KEZI-TV (Ch. 9)
Sun. 5pm

MEDFORD
KOBI-TV (Ch. 5)
Sun. 4pm

KOTI-TV (Ch. 2)
Sun. 4pm

PORTLAND
KOIN-TV (Ch. 6)
Sun. 10:30am

PENNSYLVANIA
Erie
WJET-TV (Ch. 24)
Sat. 6:30am

HARRISBURG/LANCASER/YORK
WPMT-TV (Ch. 43)
Sat. 10:30pm

PHILADELPHIA
WCAU-TV (Ch. 10)
Sun. 11:30am

WILKES BARRE/SCRANTON
WYOU-TV (Ch. 22)

Sat. 12:30pm

RHODE ISLAND
Providence/New Bedford
WLNE-TV* (Ch. 6)

SOUTH CAROLINA
Charleston
WCSC-TV* (Ch. 5)

FLORENCE
WWMB-TV (Ch. 21)
Sun. noon

GREENVILLE/SPARTANBURG/ASHEVILLE
WLOS-TV* (Ch. 13)

MYRTLE BEACH
WPDE-TV* (Ch. 15)
WWMB-TV* (Ch. 21)

SOUTH DAKOTA
Sioux Falls
KDLT-TV (Ch. 5)
Sun. 9am

TENNESSEE
Chattanooga
WDEF-TV (Ch. 12)

KNOXVILLE
WATE-TV (Ch. 6)
Sun. 5:30am

MEMPHIS
WPTY-TV (Ch. 24)
Sun. 11:30 am

NASHVILLE
WKRN-TV (Ch. 2)
Sat. 6am

TEXAS
Amarillo
KFDA-TV (Ch. 10)

BEAUMONT/PORT ARTHUR
KBMT-TV (Ch. 12)
Sun. 6:30am

DALLAS/FORT WORTH
KXAS-TV (Ch. 5)
Sat. 5pm

KXTX-TV (Ch. 39)
Sat. 5pm

EL PASO
KZIA-TV (Ch. 7)
Sun. 8am

HOUSTON
KTRK-TV (Ch. 13)
Sun. 11am

LUBBOCK
KLHK-TV (Ch. 13)
Sun. 5pm

NACOGDOCHES
KLSB-TV (Ch. 19)
Sat. 5pm

TYLER/LONGVIEW
KETK-TV (Ch. 56)
Sat. 5pm

WACO/TEMPLE/BRYAN
KXXV-TV (Ch. 25)
Sun. 10:30am

WEST VIRGINIA
Bluefield/Oak Hill
WOAY-TV* (Ch. 4)



A custom stair rises above the barn's great room. "The ability to build a good staircase," Norm Abram says, "is the ultimate merit badge of a carpenter."

Charleston/Huntington
WCHS-TV* (Ch. 8)
Clarksburg/Weston
WDTW-TV (Ch. 5)

VERMONT
Burlington/Plattsburgh
WCAX-TV (Ch. 3)
Sun. 11am

VIRGINIA

Norfolk/Portsmouth/
Newport News

WVEC-TV (Ch. 13)

Sun. 11am

Richmond/Petersburg

WAWB-TV (Ch. 65)

Sat. 5pm

Roanoke/Lynchburg

WSLS-TV (Ch. 10)

Sat. 6:30am

WASHINGTON

Seattle/Tacoma

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Sat. 10:30am

Spokane

KXLY-TV (Ch. 4)

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Florence
WFHQ-TV
Thu. 8:30pm, Sat. 8pm
Huntsville
WHIQ-TV
Thu. 8:30pm, Sat. 8pm
Louisville
WGIQ-TV
Thu. 8:30pm, Sat. 8pm
Mobile
WEIQ-TV
Thu. 8:30pm, Sat. 8pm
Montgomery
WAQ-TV
Thu. 8:30pm, Sat. 8pm
Mount Cheaha
WCQ-TV
Thu. 8:30pm, Sat. 8pm

ALASKA

Anchorage
KAKM-TV
Mon. 6pm, Sat. 9:30am
Bethel
KYUK-TV
Fri. 9am and 8pm
Sat. 8am
Fairbanks
KUAC-TV
Fri. 8pm, Sat. 8am
Juneau
KTOO-TV
Fri. 8pm, Sat. 8am

ARIZONA

Phoenix
KAET-TV
Sat. noon
Tucson
KUAS-TV
Sat. 11am and 6:30pm
KUAT-TV
Sat. 11am and 6:30pm

ARKANSAS

Arkadelphia
KETG-TV
Sat. noon, Sun. 5:30pm
Fayetteville
KAFT-TV
Sat. noon, Sun. 5:30pm
Jonesboro
KTEJ-TV
Sat. noon, Sun. 5:30pm
Little Rock
KETS-TV
Sat. noon, Sun. 5:30pm
Mountain View
KEMV-TV
Sat. noon, Sun. 5:30pm

CALIFORNIA

Eureka
KEET-TV
Wed. 7:30pm, Sat. 10:30am
Fresno
KVPT-TV
Sat. 9:30am, Sun. 7pm
Huntington Beach
KOCE-TV
Sat. 4:30pm
Los Angeles
KCET-TV
Sat. 5:30pm
Redding
KIXE-TV
Sat. 1:30pm
Rohnert Park
KRCB-TV
Wed. noon, Sun. 7:30pm
Sacramento
KVIE-TV
Thu. 8pm, Sat. 3:30pm

San Bernardino

KVCR-TV
Thu. 8pm
San Diego
KPBS-TV
Sat. 11am
San Francisco
KQED-TV
Sat. 5pm
San Jose
KTEH-TV
Wed. 9pm, Sat. 3pm
Sun. 5:30pm
San Mateo
KCSM-TV
Wed. 6:30pm, Sat. 9:30am
Sun. 9am

COLORADO

Boulder
KBDI-TV
Mon. 10pm, Wed. 5:30pm
Sat. 5:30pm, Sun. 4pm
Denver
KRMA-TV
Sat. 2:30pm, Sun. 5:30pm
Pueblo
KTSC-TV
Thu. 8:30pm, Sat. 2:30pm

CONNECTICUT

Fairfield
WEDW-TV
Tue. noon, Thu. 11pm
Sat. 8pm, Sun. 10:30am
Hartford
WEDH-TV
Tue. noon, Thu. 11pm
Sat. 8pm, Sun. 10:30am
Norwich
WEDN-TV
Tue. noon, Thu. 11pm
Sat. 8pm, Sun. 10:30am

DISTRICT OF COLUMBIA

WETA-TV

Sat. 9am and 5:30pm

FLORIDA

Daytona Beach
WCEU-TV
Tue. 8pm, Sat. 6pm
Fort Myers/Naples
WSPE-TV
Sat. 1:30pm, Sun. 5pm
Gainesville
WUFT-TV
Sat. 9:30am and 1:30pm
Jacksonville
WJCT-TV
Sat. 2:30pm
Miami
WLRN-TV
Sun. 10am
WPBT-TV
Sat. 6pm
Orlando
WMFE-TV
Sat. 9am and 1:30pm
Sun. 9am
Pensacola
WSRE-TV
Sat. 12:30pm

Tampa

WEDU-TV
Sat. 11:30am, Sun. 7pm
WUSF-TV
Wed. 9pm, Sun. 5:30pm

GEORGIA

Atlanta
WGTV-TV
Sat. 5:30pm, Sun. 8pm
WPBA-TV
Mon. 8pm, Wed. 2pm
Sat. 6pm
Chatsworth
WCLP-TV
Sat. 5:30pm, Sun. 8pm

Cochran

WDCO-TV
Sat. 5:30pm, Sun. 8pm
Columbus
WJSP-TV
Sat. 5:30pm, Sun. 8pm
Dawson
WACS-TV
Sat. 5:30pm, Sun. 8pm
Pelham
WABW-TV
Sat. 5:30pm, Sun. 8pm
Savannah
WVAN-TV
Sat. 5:30pm, Sun. 8pm
Waycross
WXGA-TV
Sat. 5:30pm, Sun. 8pm
Wrens

COLORADO

WCES-TV
Sat. 5:30pm, Sun. 8pm
HAWAII
Honolulu
KHET-TV
Thu. 7:30pm, Sun. 4:30pm
Wailuku
KMEB-TV
Thu. 7:30pm, Sun. 4:30pm

IDAHO

Boise
KAID-TV
Sun. 4:30pm
Coeur d'Alene
KCDT-TV
Sun. 3:30pm
Moscow
KUID-TV
Sun. 3:30pm
New Haven
WEDY-TV
Tue. noon, Thu. 11pm
Sat. 8pm, Sun. 10:30am
Twin Falls
KIPT-TV
Sun. 4:30pm

ILLINOIS

Carbondale
WSIU-TV
Thu. 7pm, Sat. 12:30pm
Chicago
WTTW-TV
Tue. 7:30pm, Sat. 12:30pm
Jacksonville
WSEC-TV
Thu. 10pm, Sun. 1:30pm
Macomb
WMEC-TV
Thu. 10pm, Sun. 1:30pm
Moline
WQPT-TV
Tue. 7pm, Sat. 5:30pm
Olney
WUSI-TV
Thu. 7pm, Sat. 12:30pm
Peoria
WTVP-TV
Thu. 10pm, Sat. 12:30pm
Quincy
WQEC-TV
Thu. 10pm, Sun. 1:30pm
Urbana
WILL-TV
Thu. 7:30pm, Sun. 3:30pm

INDIANA

Bloomington
WTIU-TV
Mon. 5pm, Thu. 11pm
Sat. 12:30pm
Evansville
WNIN-TV
Sat. 12:30pm and 6pm
Sun. 4:30pm
Fort Wayne
WFWA-TV
Sat. 10am and 3pm
Indianapolis
WFYL-TV
Sat. 10am, Sun. 7pm
Merrillville
WYIN-TV
Wed. 9pm, Thurs. 8:30am

Muncie

WIPB-TV
Thu. 8pm, Sun. 4:30pm
South Bend
WNIT-TV
Fri. 10:30am, Sat. 2pm
Vincennes
WVUT-TV
Sat. 12:30pm

IDAHO

Des Moines
KDIN-TV
Fri. 6:30pm, Sat. 1:30pm
Fort Dodge
KTIN-TV
Fri. 6:30pm, Sat. 1:30pm
Iowa City
KIIN-TV
Fri. 6:30pm, Sat. 1:30pm
Mason City
KYIN-TV
Fri. 6:30pm, Sat. 1:30pm
Omaha
KBN-TV (Council Bluffs)
Fri. 6:30pm, Sat. 1:30pm
Red Oak
KHIN-TV
Fri. 6:30pm, Sat. 1:30pm
Sioux City
KSIN-TV
Fri. 6:30pm, Sat. 1:30pm
Waterloo
KRIN-TV
Fri. 6:30pm, Sat. 1:30pm

KANSAS

Bunker Hill
KOOD-TV
Thu. 7pm, Sat. 12:30pm
Lakin
KSWK-TV
Thu. 7pm, Sat. 12:30pm
Topeka
KTWU-TV
Sat. 9:30am
Wichita
KPTS-TV
Sat. 11:30am, Sun. 11am

KENTUCKY

Ashland
WKAS-TV
Sun. 5pm
Bowling Green
WKG-TV
Mon. 6:30pm
WKYU-TV
Tue. 1pm, Mon. 6:30pm

Covington

WCVN-TV
Sun. 5pm
Elizabethtown
WKZT-TV
Sun. 5pm
Hazard
WKHA-TV
Sun. 5pm
Lexington
WKLE-TV
Sun. 5pm
Louisville
WKMJ-TV
Sun. 5pm
Salisbury
WCPB-TV
Sat. 4:30pm, Sun. 6:30pm

MISSISSIPPI

Annapolis
WMPT-TV
Sat. 4:30pm, Sun. 6:30pm
Baltimore
WMPB-TV
Sat. 4:30pm, Sun. 6:30pm
Frederick
WFPT-TV
Sat. 4:30pm, Sun. 6:30pm
Hagerstown
WWPB-TV
Sat. 4:30pm, Sun. 6:30pm
Oakland
WGPT-TV
Sat. 4:30pm, Sun. 6:30pm
Salisbury
WCPB-TV
Sat. 4:30pm, Sun. 6:30pm

MASSACHUSETTS

Boston
WGBH-TV
Thu. 8pm, Sat. 5:30pm
WGBX-TV
Mon. 9pm, Sun. 9am
and 12:30pm

MISSOURI

Joplin
KÖZJ-TV
Sat. 12:30pm
Kansas City
KCPT-TV
Thu. 7:30pm, Sat. 12:30pm
Saint Louis
KETC-TV
Wed. 12:30pm, Sat. 6:30pm
Sedalia
KMOS-TV
Sat. 12:30pm
Springfield
KOZK-TV
Sat. 12:30pm

Program dates and times are subject to change. Please check your local listings.

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MONTANA

Bozeman
KUSM-TV
Sat. 11:30am

NEBRASKA

Alliance
KTNE-TV
Sat. 10:30am and 5:30pm

Bassett
KMNE-TV
Sat. 10:30am and 5:30pm

Hastings

KHNE-TV
Sat. 5:30pm, and 10pm

Lexington

KLNE-TV
Sat. 10am and 5:30pm

Lincoln

KUON-TV
Sat. 10am and 5pm

Merriman

KRNE-TV
Sat. 9am and 4:30pm

Norfolk

KXNE-TV
Sat. 10am and 5:30pm

North Platte

KPNE-TV
Sat. 10am and 5:30pm

Omaha

KYNE-TV
Sat. 10am and 5:30pm

NEVADA

Las Vegas
KLVX-TV
Sat. 9am

Reno

KNPB-TV
Sat. 10:30am and 1pm

NEW HAMPSHIRE

Durham
WENH-TV
Thu. 8:30pm, Sun. 10am

Keene

WEKW-TV
Thu. 8:30pm, Sun. 10am

Littleton

WLED-TV
Thu. 8:30pm, Sun. 10am

NEW JERSEY

Camden
WNJS-TV
Tue. 8pm, Sat. 8pm

Sun. 5:30pm

Montclair

WNJN-TV
Tue. 8pm, Sat. 8pm

Sun. 5:30pm

New Brunswick

WNJB-TV
Tue. 8pm, Sat. 8pm

Sun. 5:30pm

Trenton

WNJT-TV
Tue. 8pm, Sat. 8pm

Sun. 5:30pm

NEW MEXICO

Albuquerque
KNME-TV
Thu. 7pm, Sun. 10am

Las Cruces

KRWG-TV
Sat. 11:30am

Portales

KENW-TV
Sat. 3:30pm

NEW YORK

Binghamton
WSKG-TV
Sat. 1:30pm

Buffalo

WNED-TV
Sat. 10:30am

WNEQ-TV
Sun. 7pm

Long Island

WLW-TV
Thu. 8:30pm, Sat. 10:30am

Sun. 8pm

New York

WNET-TV
Sat. 5:30pm

Norwood

WNPI-TV
Sat. 10:30am

Plattsburgh

WCFC-TV
Sun. 11:30am

Rochester

WXXI-TV
Sat. 10:30am, Sun. 5:30pm

Schenectady

WMHT-TV
Tue. 1:30pm, Sat. 10:30am

Syracuse

WCNY-TV
Thu. 8pm, Sat. 10:30am

Watertown

WNPE-TV
Sat. 10:30am

NORTH CAROLINA

Asheville
WUNF-TV
Sat. 5:30pm, Sun. 9am

Chapel Hill

WUNC-TV
Sat. 5:30pm, Sun. 9am

Charlotte

WTVI-TV
Tue. 12:30pm, Thu. 8pm

Sat. 5pm, Sun. 9am

Columbia

WUND-TV
Sat. 5:30pm, Sun. 9am

Greenville

WUNK-TV
Sat. 5:30pm, Sun. 9am

Jacksonville

WUNM-TV
Sat. 5:30pm, Sun. 9am

Linville

WUNE-TV
Sat. 5:30pm, Sun. 9am

Roanoke Rapids

WUNP-TV
Sat. 5:30pm, Sun. 9am

Wilmingon

WUNJ-TV
Sat. 5:30pm, Sun. 9am

Winston-Salem

WUNL-TV
Sat. 5:30pm, Sun. 9am

NORTH DAKOTA

Bismarck
KBME-TV
Mon. 10pm, Tue. 10pm

Wed. 10pm, Thu. 7pm

and 10pm, Sat. 6pm

Dickinson

KDSE-TV
Mon. 10pm, Tue. 10pm

Wed. 10pm, Thu. 7pm

and 10pm, Sat. 6pm

Ellendale

KJRE-TV
Mon. 10pm, Tue. 10pm

Wed. 10pm, Thu. 7pm

and 10pm, Sat. 6pm

Fargo

KFME-TV
Mon. 10pm, Tue. 10pm

Wed. 10pm, Thu. 7pm

and 10pm, Sat. 6pm

Grand Forks

KGFE-TV
Mon. 10pm, Tue. 10pm

Wed. 10pm, Thu. 7pm

and 10pm, Sat. 6pm

Minot

KSRE-TV
Mon. 10pm, Tue. 10pm

Wed. 10pm, Thu. 7pm

and 10pm, Sat. 6pm

Williston

KWSE-TV
Mon. 10pm, Tue. 10pm

Wed. 10pm, Thu. 7pm

and 10pm, Sat. 6pm

OHIO

Akron
WEAO-TV
Sat. 10:30am and 5pm

Sun. 6pm

Athens

WOUB-TV
Wed. 1:30pm, Sat. 5pm

Bowling Green

WBGU-TV
Mon. 3pm, Sat. 1:30pm

Cambridge

WOUC-TV
Wed. 1:30pm, Sat. 5pm

Cincinnati

WCET-TV
Thu. 8pm, Sat. 9am

Cleveland

WVIZ-TV
Tue. 7:30pm, Sat. 1pm

Conway

WHMC-TV
Sat. 1:30pm

Greenwood

WRLK-TV
Sat. 1:30pm

Toledo

WGTE-TV
Thu. 8pm, Sat. 1pm

Sun. 1pm

Youngstown

WNEO-TV
Sat. 10:30am and 5pm

Sun. 6pm

OKLAHOMA

Cheyenne
KWET-TV
Sat. 9:30am and 12:30pm

Sun. 3pm

Eufaula

KOET-TV
Sat. 9:30am and 12:30pm

Sun. 3pm

Greenwood

WNEH-TV
Sat. 1:30pm

Rock Hill

WNSC-TV
Sat. 1:30pm

Oklahoma City

KETA-TV
Sat. 9:30am and 12:30pm

Sun. 3pm

Tulsa

KOET-TV
Sat. 9:30am and 12:30pm

Sun. 3pm

Spokane

KMBH-TV
Sat. 12:30pm

Houston

KUHT-TV
Mon. 1:30pm

Sun. 11:30am

Killeen

KNCT-TV
Sat. 12:30pm, Sun. 9:30am

Lubbock

KTXT-TV
Sat. 12:30pm

Odessa

KOCV-TV
Tue. noon, Sun. 12:30pm

San Antonio

KLRN-TV
Sat. 5:30pm

Waco

KCTF-TV
Mon. 12:30pm, Sat. 9am

and 6:30pm

UTAH

Provo
KBYU-TV
Sat. 9:30am and noon

Salt Lake City

KUED-TV
Sat. 8am and 5pm

Vermont

Burlington
WETK-TV
Thu. 8pm, Sat. 11am

Rutland

WVER-TV
Thu. 8pm, Sat. 11am

Saint Johnsbury

WVTB-TV
Thu. 8pm, Sat. 11am

Windsor

WVTA-TV
Thu. 8pm, Sat. 11am

Charlottesville

WHTJ-TV
Sat. 8:30am

Riverton

KCWC-TV
Sat. noon and 5pm

Erie

WQLN-TV
Sat. 6:30pm

Harrisburg

WITF-TV
Thu. 8pm, Sat. 6pm

Philadelphia

WHYY-TV
Thu. 7pm, Sat. 11am

Pittsburgh

WQED-TV
Sat. 6:30pm

Lexington

WLJT-TV
Thu. 9:30pm, Sat. 12:30pm

Pittston

WVIA-TV
Thu. 7pm, Sat. 11am

Memphis

WKNO-TV
Thu. 7:30pm, Fri. noon

University Park

WPSX-TV
Sat. 5pm, Sun. 4:30pm

RHODE ISLAND

Providence
WSBE-TV

Tue. 8:30pm, Sun. 6pm

TEXAS

Amarillo
KACV-TV
Sat. 12:30pm

Austin

KLRU-TV
Sat. 5:30pm

College Station

KAMU-TV
Sat. 12:30pm

Corpus Christi

KEDT-TV
Sat. 12:30pm and 9pm

Dallas/Fort Worth

KERA-TV
Sat. 9am and 6:30pm

El Paso

KCOS-TV
Tues. 7pm

Harlingen

KMBH-TV
Sat. 12:30pm

Houston

KUHT-TV
Mon. 1:30pm

Sun. 11:30am

Killeen

KNCT-TV
Sat. 12:30pm, Sun. 9:30am

Lubbock

KTXT-TV
Sat. 12:30pm

Odessa

KOCV-TV
Tue. noon, Sun. 12:30pm

San Antonio

KLRN-TV
Sat. 5:30pm

Waco

KCTF-TV
Mon. 12:30pm, Sat. 9am

and 6:30pm

UTAH

Provo
KBYU-TV
Sat. 9:30am and noon

Salt Lake City

KUED-TV
Sat. 8am and 5pm

Vermont

Burlington
WETK-TV
Thu. 8pm, Sat. 11am

Rutland

WVER-TV
Thu. 8pm, Sat. 11am

Saint Johnsbury

WVTB-TV
Thu. 8pm, Sat. 11am

Windsor

WVTA-TV
Thu. 8pm, Sat. 11am

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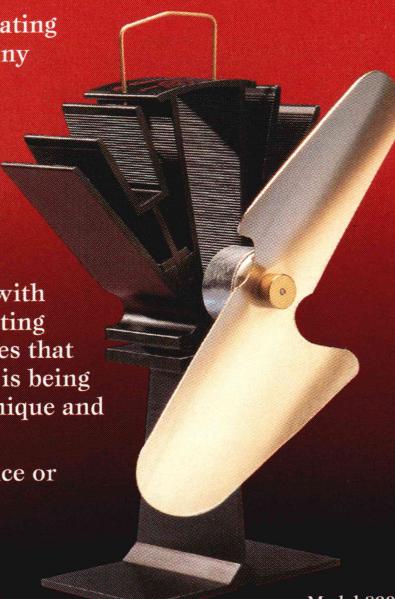
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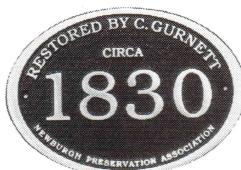
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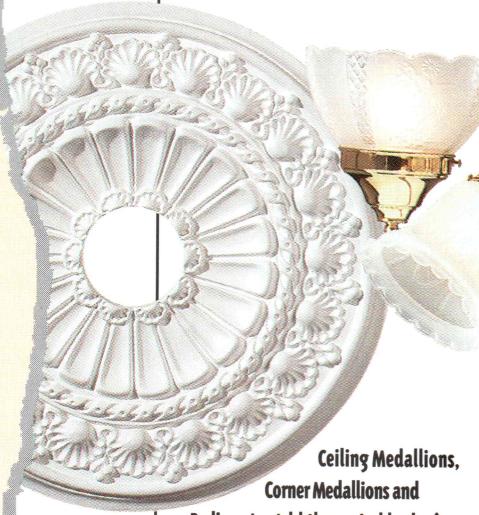
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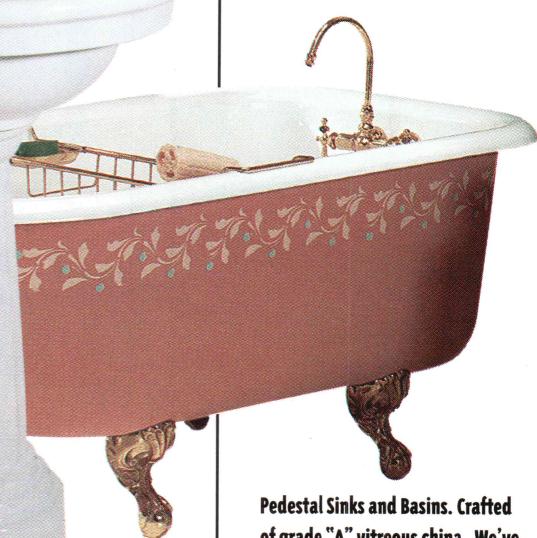
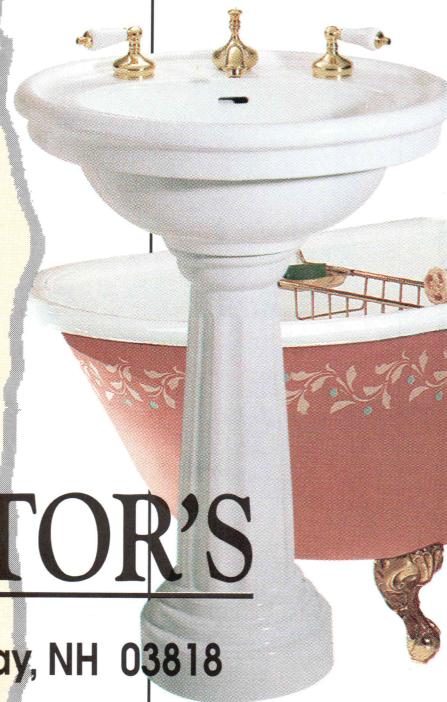
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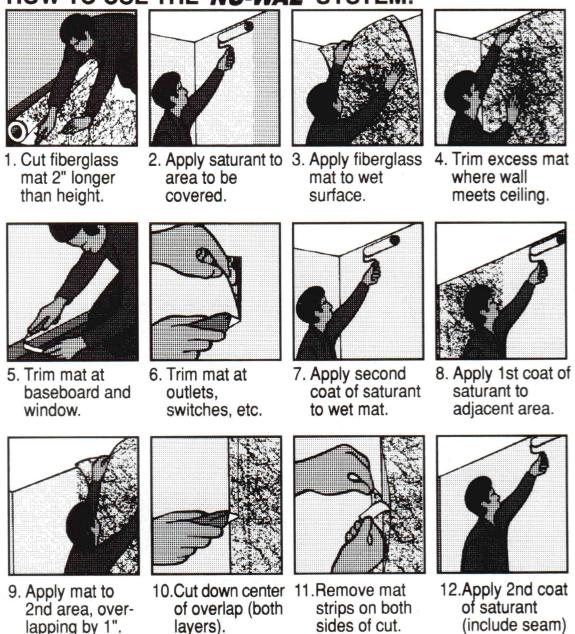


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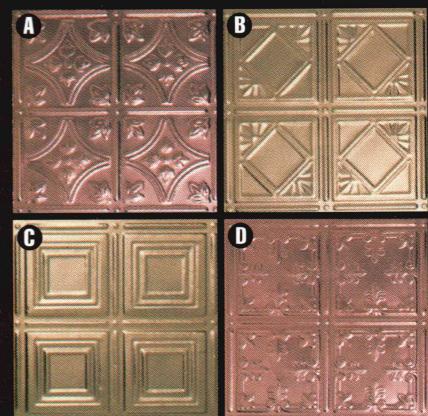
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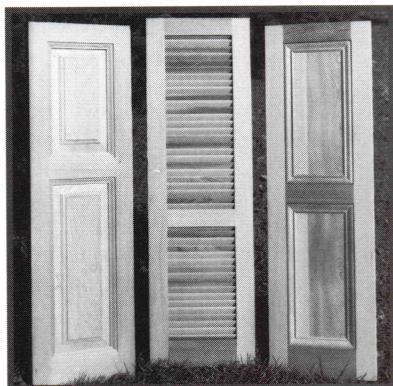
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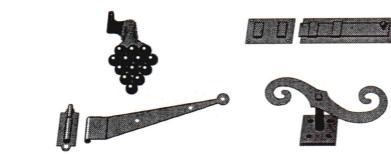
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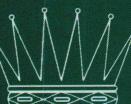
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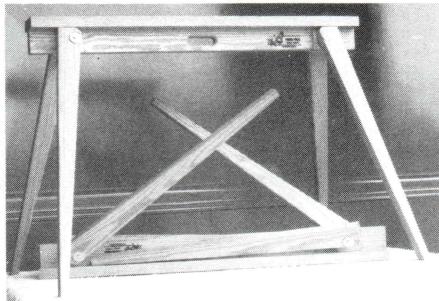
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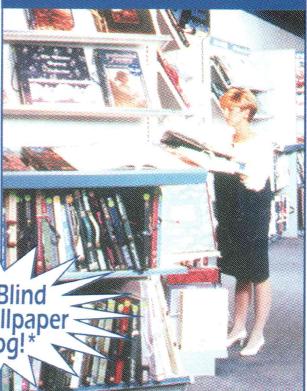
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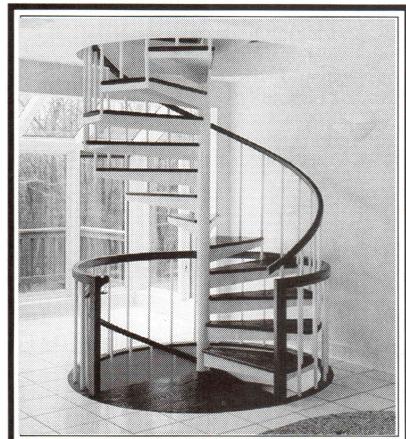
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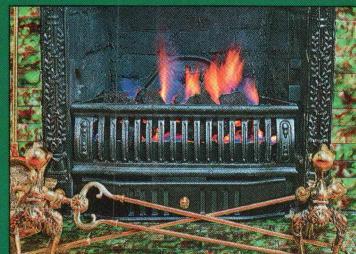
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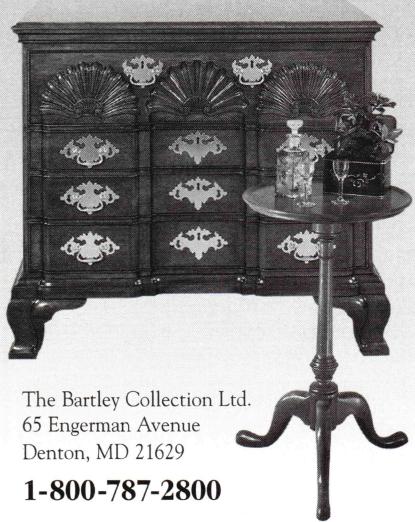
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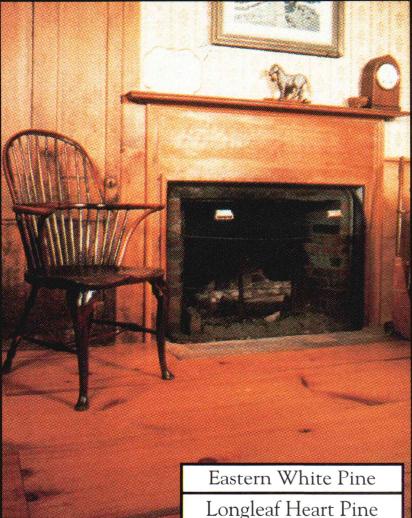


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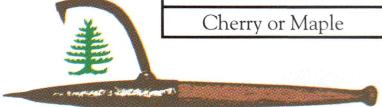
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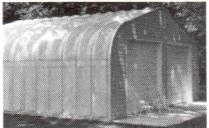
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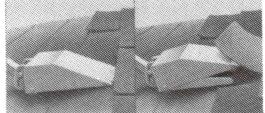
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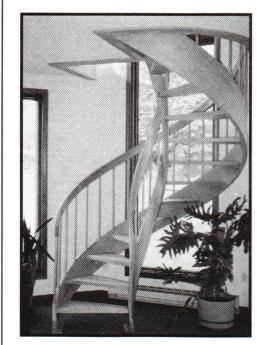
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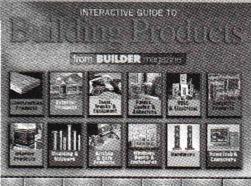
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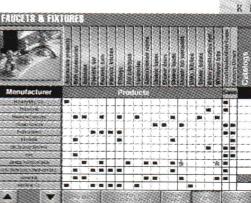
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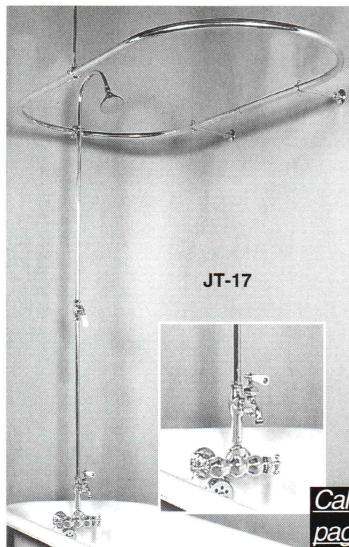
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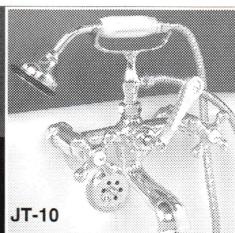
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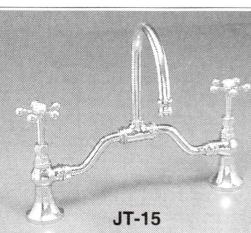
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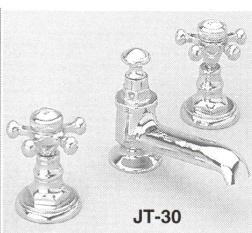
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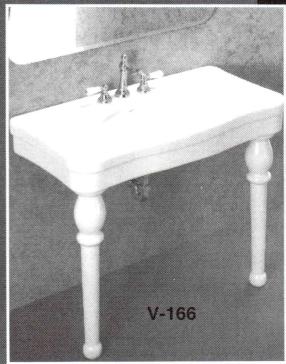
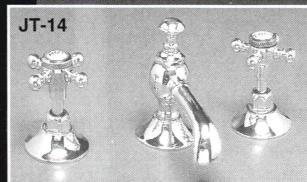
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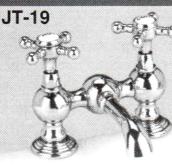
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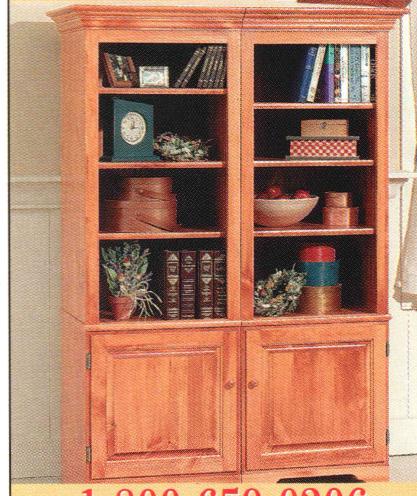


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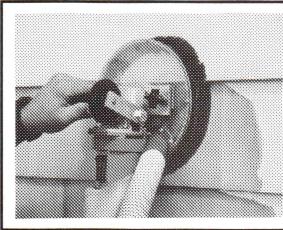
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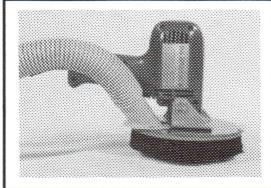
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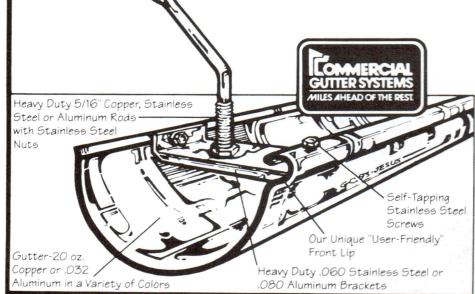


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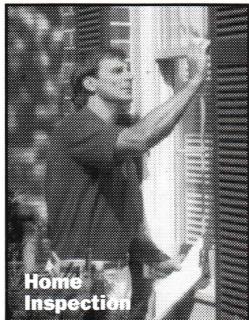
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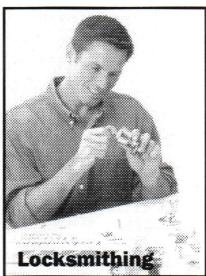
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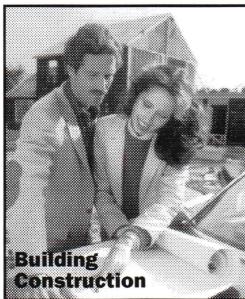
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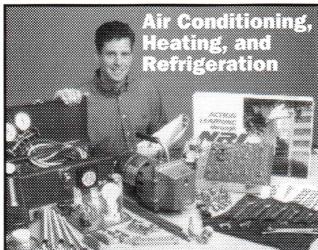
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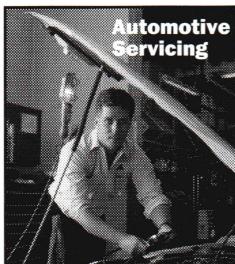
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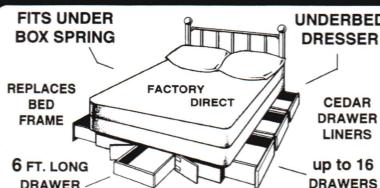
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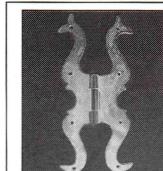
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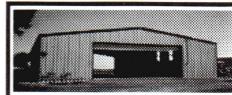
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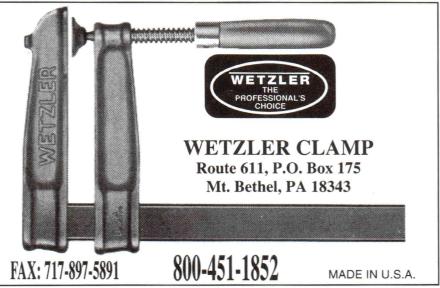
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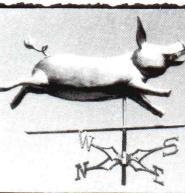


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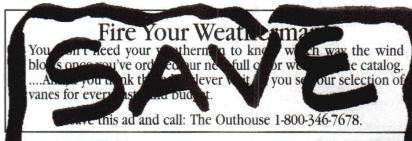
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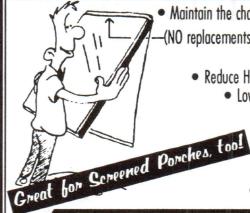
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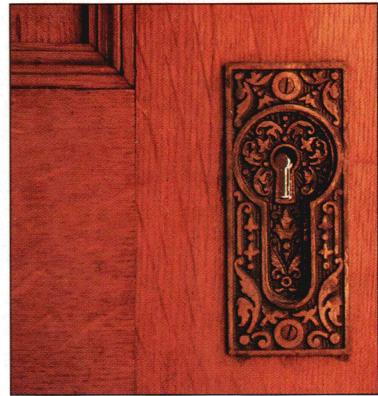
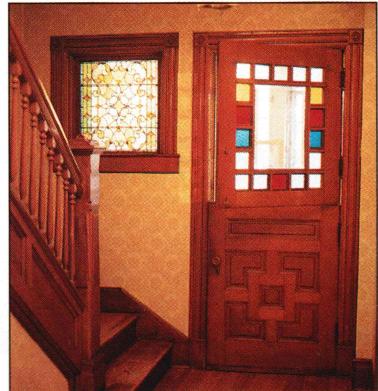
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CONTACT

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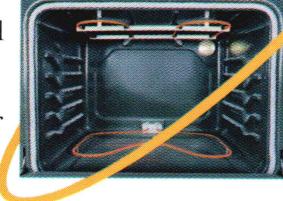
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